Doctoral Dissertation

Deterministic Physical & Intelligence Learning

based on Newton's Anti-Entropy

with Screw-Structured Particles

by

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In order to obtain Doctorate in Mathematical Physics

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having offered me the chance of writing this doctoral dissertation. I express profound thanks to my mentor Prof. Anatoly Pavlovich Smirnov of Russian Academy of Sciences for having accepted to become my mentor, and for having cordially encouraged me and guided me to further formulate my original ideas in theoretical physics and in "universal science" with his original viewpoint of Newton's Third Law and the real process of phase transition.

Preface

First, I have to say that when I face the foolhardy and totally eclectic theories and practices of today's conventional physics, I found Russian physicists offering us an excellent fountain of fundamental and extremely interesting ideas in physics. I would like to express thanks to all the Russian physicists I met at the International Conference of New Ideas in Natural Sciences, HYPOTHESIS III 1999 and also to those who contributed papers to the proceedings of New Ideas in Natural Sciences 1996.

Original Newton's Third Law, that is, the law of real action/reaction, allows to describe not only a process of energy dissipation, but also of energy concentration, the latter of which is the anti-entropy process. This original Newton's Third Law, emphasized by Prof. Anatoly Pavlovich Smirnov but misinterpreted by all the conventional physicists, plays a quite important role in the world where we live. Newton was inspired by the dynamics of levels, screws and wedges when he created this Third Law. He himself wrote so. My idea is that, if only we construct a model of the particles/anti-particles and the dynamics of their action/reaction as all the particles/anti-particles having Screw structures which are carried by Screw structures in the processes of action/reaction, then the dynamics of all the action/reaction will be 100% assured to respect Newton's Third Law.

And this Newton's third law and the model of screw-structured particles based on it offer a theoretical ground for reasoning about **ANTI-ENTROPY PROCESSES** inside atoms, among the stars and planets of the universe, in the biological world, and in intelligent activities of information processing.

This idea did not come to my mind from the very beginning. In this dissertation, I plainly describe the process in which this idea is discovered and attained. So readers might find some contradictions in details in the course of the development toward that discovery. The discovery of

screw-structured model naïve in the beginning is still advanced to a quantitatively precise description in the third phase.

 So the description in this dissertation can be classified in three phases: the first is before the discovery of the model of screw-structured particles (the first phase uses only concepts of negative time, negative mass, electrical charge as an imaginary mass, and the micro-oscillation of physical time), second is the qualitative but naïve description of the model of screw-structured particles, and the third phase is the quantitative description of time and its relation with the original Newtonian action, i.e., screw-structured particles, enabling anti-entropy processes. The third phase became possible after I derived in my thesis the **non-integer** dimension of **time** from "inversely squared distance" in Coulomb force and in universal gravity. Using this non-integer dimension of time, I had derived Prof. A. P. Smirnov's equation (31) in my thesis.

If you are interested in knowing first the final image of my theories, I advise you to read this dissertation from **the last "Phase III" first** (the most important and precise phase), then "Phase II" (naïve explanation of my screw model), and back to the beginning "Phase I" (before the discovery of the screw-model). More in detail, in order to see my model of screw-structured particles and screw-structured electron-positron pairs of the vacuum ether, whose concept is always used in the background of Phase III, it is advisable to read "Screw model of the outer electric spiral and the inner mass spiral", "Vacuum is an ocean of electron-positron pairs", "Only when Axis points to the moving direction, electromagnetic wave is emitted", "Atoms are connected by Electrons to stably form a molecule", "Birth of the universe", "Screw-structured particles show no need for <strong interaction>", and "No <quark> exists" of Phase II **before** reading **Phase III**.

Abstract

  Learning in artificial intelligence is defined as **extracting a subjacent function from data**. This learning is to be carried out in the real physical world. If we try to do so using today's conventional sciences, especially conventional physics and conventional information science, we encounter two fundamental problems. One is that as today's conventional physics is eclectic and probabilistic and as today's conventional information science has its "information entropy" defined probabilistically which has no relation with the real physical processes, they do not offer us the right concept of **entropy** to be used as template for learning. The other is that neither conventional physics nor conventional information science defines what is **"noise"**. I conclude from my research in information science that probability theories and statistics can unsatisfactorily classify and memorize but can never learn, and that no such excessively convenient scalar number "probability" supposedly omnipresent everywhere can ever exist in our universe. The seeming "noise" does not originate from the complexity of the macro-world, but

originates already in the micro-world of particles. My hypothesis is that it is only the micro-oscillation of physical time that generates the "noise", and all other seeming "noise" are not really noise but are non-linear mathematical "chaos". This dissertation will show that the nonlinear action/reaction equation of Newton's original third law serves for analyzing that non-linear mathematical "chaos" by proposing an artificial neural network model based on Newton's original third law. Even the basic "noise" generated in concrete by rotating electron-positron pairs of the ether, that is, the micro-oscillation of physical time, should be able to be deterministically determined if only we can find simultaneous equations, using the "noise equations" of major physical entities I proposed in my former thesis. The now popular "quantum computer" invented by a Japanese researcher, based on the typical probabilistic misinterpretation of quantumness in modern physics, is a fake. In this dissertation, quantity of information is defined as: Sum of the absolute value of physical energies that all the Actions have that have participated and are going to participate in dynamically and statically changing the shape of the vacuum where the information is.

The original Newton's third law of action/reaction having been misinterpreted for a long time, which has been pointed out by Prof. Anatoly Pavlovich Smirnov of Russian Academy of Science, is powerful enough to entirely rectify the systematic mistake of today's conventional physics. Newton's original third law of action/reaction along with the micro-oscillation of physical time are necessary to overcome the fatal defects of today's conventional physics that believes in monotonous entropy increase, that invented all sorts of "conservation laws", that all surprised to see that in the micro-world no conservation laws are respected, invented all sorts of bizarre and probabilistic hypotheses and interpretations here and there, that cannot explain why in the micro-world, "discreteness" or "quantumness" takes place, and that has become so eclectic that Nobel prize winner Feynman pointed out, no one knows today in what order to apply their theories, and that it can no longer seriously analyze the real processes of action/reaction including anti-entropy processes. In my thesis I wrote before this dissertation, I showed how Newton's original third law and the concept of micro-oscillation of physical time can fundamentally overcome the fatal defects of today's conventional physics. This dissertation has been written in the same direction, and proposes a tentative construction of particle models in conformity with Newton's original third law.

As **Newton** himself was inspired of the **third law of action/reaction**, in observing levels, **screws,** and wedges, I construct a **model of screw-structured particles,** which will 100% ensure Newton's third law. In this dissertation, I will show in concrete that this model of screw-structured particles will overcome the following defects of today's conventional physics: 1) why an orbital electron of an atom, though in electromagnetics it is the law that an electric charge emits electromagnetic waves when accelerated, does not emit electromagnetic waves, 2) why electrons of different atoms

serve as a connection for forming a molecule, though the (supposedly ball-structured) electrons have both the negative electric charge that should normally produce centrifugal force against each other (hence, today's conventional physics, to our surprise, has not succeeded in explaining Stable structures of any molecules or atoms more complicated than a simple hydrogen atom), and 3) why the centripetal force inside an atomic nucleus (= so-called "strong interaction") is 100 times stronger than the conventional physicists (Hideki Yukawa's "charm particle", "gluon", etc. of "quantum chromo-dynamics" are fakes) expect and why stepwise effect like "quarks" (in fact "quark" is a fake and does not exist) appears.

  I describe in detail that <u>a **particle** is made of a **spiral string ring** which forms the **outer electric** spiral and **inner mass** spiral</u>. The particle **"electron" has an anti-clockwise winding electric** spiral and a **clockwise** winding **mass** spiral. The antiparticle **"positron" has a clockwise** winding **electric** spiral and an **anti-clockwise** winding **mass** spiral. These structures suppose the possible existence of negative mass and of negative direction of time. A particle like "Higgs particle" (particle that confers mass to a particle) in today's conventional physics is a fake. Vacuum which works as media of electromagnetic waves certainly has ether which should be an ocean of hidden electron-positron pairs. An electron and a positron are hidden in the vacuum, because the exactly same amounts of positive and negative mass compensate each other. It is the rotating chain of the electron-positron pairs of the vacuum that carries particles in the electromagnetic field, clutching the groove of the spiral of particles with its own groove. It is the electron-positron pair of the vacuum slightly shifted from each other that shows itself and shows slight mass when located on the trajectory of light. We should not forget that when light passes by, not only the electron-positron pairs on the trajectory are rotating, but also all the other hidden electron-positron pairs in the space around them are rotating. This view of a particle having a spiral structure criticizes and surmounts the eclecticism of Copenhagen doctrine (eclectic in that it does not give a structural explanation why light has both a "particle" aspect and a "wave" aspect), which makes conventional physicists believe that a wave is something that can probabilistically propagate even without media. **One Rotation** of a particle corresponds to **One Action**. The ether has a double or multiple structure: static ether and dynamic ethers, the latter of which accompany, for instance, the solar systems, the earth, or even each physical object. Michelson & Morley's experiment is not a proof at all of the non-existence of ether. They never supposed that there are dynamic ethers that accompany the solar systems, the earth, or even each physical object. A nucleon was originally an electron-positron pair whose spiral strings are stretched and lengthened. The clockwise winding electric spiral of the positron is turned into the clockwise winding stretched inner mass spiral of the nucleon, and the anti-clockwise winding electric spiral of the electron is stretched and lengthened to such an extent that it is no longer useful as an electric outer spiral (with practically no electric charge). A neutron consists of this

nucleon and of an electron captured inside the mass spiral of the nucleon and whose spiral string ring is linked with the spiral string ring of the nucleon. A proton consists of that nucleon and of a positron attached on the surface of it, whose spiral string ring is linked with the spiral string ring of the nucleon. The so-called "mesons" of various sizes are nothing more than the spiral string extended and lengthened to various degrees of the electron-positron pair (in other words, nucleon with the spiral string to several degrees). A neutrino, a destroyed fragment of the spiral string, does not have the normal mass-producing mechanism, that is, the mass spiral, will never show constant value of mass. In the beginning of the universe, there was a space of vacuum, on one side of which, through some anti-entropy process, electrons were concentrated and on the other side of which, through some anti-entropy process, positrons were concentrated. Positrons dashed toward the electrons through the vacuum consisting of the ocean of electron-positron pairs, and when the positron attained the velocity of light, it clung to an electron-positron pair of vacuum, turned inside-out to become an electron captured inside, pulling and lengthening the spiral string of the electron-positron pair to transform it into a nucleon. Thus a nucleon and neutron was created. The neutron decayed to a proton. The proton pulled an electron that began to turn around its orbit, thus forming a hydrogen atom. Or the proton and the electron detected inside another neutron pulled each other and got combined to form a more complex atom than that of a hydrogen, etc., etc. I criticize the "big-bang theory" (in Phase III of this dissertation, I mathematically show that "red-shift" of stars at the far corner of the universe takes place only because of the long distance, but not because of Doppler effect) and entirely replace it with this model of action/reaction. All the materials of the universe were created out of the vacuum.

According to the model of screw-structured particles, an anti-clockwise rotation seen in the direction of action propagation, advances the time, while a clockwise rotation seen in the direction of action propagation, retards the time or makes the time go backward. Any rotation of an electron with its anti-clockwise winding outer electric spiral will advance the time if seen from any direction of the space, while any rotation of an positron with its clockwise winding outer electric spiral will make the time go backward if seen from any direction of the space. A spiral of a particle rotating at a velocity different from that of the environment will bring about a possibility of an anti-entropy process.

In my thesis, I demonstrated that the equation of Compton scattering can be derived by applying my "micro-oscillation of physical time" to the directed uncertainty principle, based on the model of screw-structured particles. In this dissertation, I again demonstrate that the equation of Compton scattering can be derived by introducing an additional term of Newton's action/reaction of collision into the set of equations of momentum conservation, which Compton and Einstein used. With the model of screw-structured particles, I structurally explained how the direction of the discontinuously redirected second term of Lorentz force is determined in conformity with

Flemming's law (the size of the force is already precisely given by electromagnetism). I demonstrate that the inverse-square law of universal gravitation and of Coulomb force is derived from Newton's third law itself. The **non-integer** dimension of **time** I derived from "inversely squared distance" in Coulomb force and in universal gravitation allows me to **quantitatively** and precisely describe time-delay and time-advance during the action/reaction process in the sense of the original Newtonian action/reaction with the model of screw-structured particles, enabling anti-entropy processes and fundamentally criticizing the second law of thermodynamics, i.e., "monotonous entropy increase". I reveal that in the model of second law of thermodynamics, conventional physicists ignore the actions exerted by the molecules of gas against the electron-positron pairs of the vacuum ether, and that if they take those actions into account, the model is equivalent to enlarging and then diminishing the volume of the room back to the starting size according to Boyle-Charles law, so Boyle-Charles law itself demonstrates that the entropy change is not positive but Zero. That approach of non-integer dimension of time, which can be called "third-phase description" surmounts the only qualitative and naïve explanation using screw-structured particles, which you find in the "second-phase description" in this dissertation. Surprisingly, with the non-integer dimension of time derived from Classical Newton's universal gravitation derived from Newton's third law, I precisely derived modern Lorentz' or Einstein's time-delay ratio of a particle moving at a velocity. With the principle of non-integer dimension of time, I precisely demonstrated Kozyrev's action transmission velocity, too. The principle of non-integer dimension of time is applicable to wherever Newtonian action/reaction is taking place. The principle of non-integer dimension of time shows that Plank constant, i.e., "unit of action" is dimensionless, which is the reason why it is constant. Moreover, if we define the temperature as a reciprocal of time grain, we can demonstrate why Boyle-Charles law holds, where its constancy is assured to be equivalent to the sum of a certain number of positive and negative plank constants. I deduce that the entropy defined in thermodynamics believed to be dimensionless, is the sum of a certain number of positive and negative Plank constants now shown to be dimensionless, so the entropy change in general defined by them can be both positive and even negative. In case of the model of second law of thermodynamics, the entropy change is zero or even slightly negative. The problem of their definition of entropy is that they are totally unaware that strong nega-entropy can take place in time of action/reaction (action/reaction of collision, of gravity, and of electromagnetism). It is the strong nega-entropy that plays the most important role in creating the solar system, the biological world, and intelligence activities. So essential entropy can newly be defined based on the equation of Newton's third law as the logarithm of time-grain ratio. This definition of entropy can be applied to Prof. A. P. Smirnov's equation (31) to form a definition of entropy for many-body problems.

D.N.A. having a clockwise double helical structure, retards its internal time, decelerating the

propagation velocity of the matter wave. Protein having an anti-clockwise chirality, advances its internal time, accelerating the propagation velocity of the matter wave. Thus, the radiation from the protein is received as an anti-entropy process by D.N.A. Moreover, an object of non-orientable topology like a Moebius band or a Klein's tube merges the direction of time, and allows to freely go back and forth along the time axes. For some period of time, D.N.A. can form a Moebius band. We may find networks of a Moebius band topology inside the brains, and the entire neural network forms the topology of Klein's tube, also of non-orientable topology. "Cold nuclear reaction" or "cold nuclear fusion" that we cannot but think indispensable in living organisms when we observe the fact that about one fourth of inhaled nitrogen stays in the organism and the fact that energy consumed by a man is considerably more than that taken in as food, can be explained by the aforementioned time model, where the time grain can be considerably reduced of its size, which produces an extremely high   virtual temperature, enabling "cold nuclear reaction" or "cold fusion".

In biology, for Darwinians only strength and superiority counts. Based on Newton's original third law of action/reaction, I have demonstrated that Darwinian evolutionary theory will never support an emergence of a more advanced animal having a longer D.N.A. and having a bigger neural network, which require more energy. Darwinian evolutionary theory akin to the second law of thermodynamics (monotonous entropy increase) will allow only an emergence of animals with shorter and efficient DNA that consume less energy but accidentally more efficiently adapts to the environment. Biological activities are highly anti-entropy processes. Chemistry, having experiential laws like Boyle-Charles law, has not become more precise by the introduction of electric modern physics at all. The reason why physics has not succeeded at all in turning the biology into an exact science, though the intention was declared 50 years ago, is that physics itself is under the dominance of "monotonous entropy increase".

I create a universal science, criticizing "monotonous entropy increase" and introducing anti-entropy processes. If "monotonous entropy increase" were right, today's world of all lives would not have been created. If "monotonous entropy increase" were right, highly evolved mammals would not have learned "warm-heartedness", nor would the human have learned the sublimity of "self-sacrificing love" for others. Up to today, the fundamental philosophy of sciences, be it natural sciences or social sciences, supposes that a researcher should do the research "cool-headed" AND "COLD-HEARTED". The fundamental philosophy of all of today's conventional sciences is CRUEL, under the influence of the belief in the law of "monotonous entropy increase". We should change this situation of all sciences.

Introduction

Modern physics is totally eclectic, that is, after studying laws of one domain, one can never

foresee laws of another domain at all, stumbling over so many bizarre hypotheses. Worse still, that eclecticism is reinforced by probability & statistical theories. As a consequence, as Feynman complains, no one knows how and when to apply which "law". This is a really catastrophic situation. In fact, modern physics has systematically failed in learning from physical data. As Prof. Anatoly Pavlovich Smirnov points out, most of these eclectic confusions come from misunderstanding of Newton's third law. I will talk about it later. As Prof. Olof Sunden points out, I can reason that the only technology created based on modern physics would have been the atomic bomb. All other invented modern physical technologies are supported only by experimental results, but not by the theories of modern physics at all.

My objective, for the benefit of formation of learning theories of artificial intelligence is to thoroughly eliminate probability and statistical theories from theoretical physics, biology and information theories, and to purify the concept of physical entropy, because probability and statistical theories can only unsatisfactorily Classify and Memorize data but can Never Learn from data. Probability and statistical theories cannot distinguish "mathematical chaos" = non-linearity from "ergodicity", hence cannot distinguish the function subjacent to data from noise. If we try to make Auto-Regression/Moving-Average probability theories learn from "chaotic" (non-linear) oscillation of number series of logistic function, learning percentage is revealed to be zero. Hence, with the probability system, we are forced to infinitely memorize all the never-ending patterns of data. If we succeed in learning the asymptotic equation of logistic function, the necessary memory size for reusing the learned result is only one line of symbols of the logistic equation. In this way, in terms of the necessary memory, memorization and learning are two diametrically opposed operations. Memorization is something that one cannot but choose only after all attempts of learning failed.

The concept of entropy is so important, because activities of life and activities of neural networks are highly anti-entropy activities enabling consecutive entropy decrease, which is diametrically contradictory against the second law of thermodynamics which asserts that in the physical world entropy monotonically increases ("disorderliness monotonically increases").

In order to surmount the current miserable foolhardy situation of modern physics, the proposal of Prof. Anatoly Pavlovich Smirnov has been really decisive for me on the formulation of the theories I describe in this dissertation. He pointed out that physicists misunderstood Newton's Third Law, which describes action and reaction. For Newton, the law of action and reaction was:

$$F_1 \cdot v_1 = - F_2 \cdot v_2 \qquad\qquad (1)$$

where v_1 is the velocity of the acting object, v_2 the velocity of the reacting object, and F_2 is

the acting force the reacting object receives from the acting object acting on it, and F_2 is the reacting force the acting object receives from the reacting object in return for the action.

However, physicists believed and never doubted that in Newton's third law action and reaction would have been defined as:

$$F_1 = -F_2$$

just as many of the readers of this dissertation would have learned so at high schools.

This difference is quite decisive. Newton's third law states that at the moment of action/reaction, energy Change is conserved. Note that this is not the energy conservation law, which physicists framed up later. This original Newton's third law is decisive in that it describes energy flow, that allows both energy concentration and energy dissipation in this universe, instead of allowing only energy dissipation in case of conventional physicists' modern physics. Energy concentration occurs when $v_1 > v_2$ so $|F_2| > |F_1|$ and this is exactly the case of anti-entropy, whereas energy dissipation occurs when $v_1 < v_2$ so $|F_2| < |F_1|$, which is the case of entropy increase. This definition of the concept of entropy already eliminates the probabilistic/statistical entropy concept proposed by Boltzmann.

In extreme situations, this formula (1) of action/reaction in Newton's third law serves for both the misinterpreted "Newton's third law" and so-called "law of momentum conservation". Only in the special case $v_1 = v_2$, the above formula turns into: $F_1 = -F_2$ which is exactly the misinterpreted action/reaction law taught in courses of today's physics at school.

Let's transform the formula (1) as follows:

$$(m_1 \cdot \alpha_1) \cdot v_1 = (m_2 \cdot \alpha_2) \cdot v_2$$

$$\left(m_1 \cdot \frac{v_1' - v_1}{\Delta t_1} \right) \cdot v_1 = \left(m_2 \cdot \frac{v_2' - v_2}{\Delta t_2} \right) \cdot v_2$$

$$m_1 \cdot (v_1' - v_1) \cdot \frac{v_1}{\Delta t_1} = m_2 \cdot (v_2' - v_2) \cdot \frac{v_2}{\Delta t_2}$$

where m_1 and m_2 are mass of the acting and reacting objects, and Δt_2 is the lapse of time during which action acted on the reacting object, and Δt_1 the lapse of time during which reaction reacted on the acting object.

If we suppose $\frac{v_1}{\Delta t_1} = \frac{v_2}{\Delta t_2}$ (this hypothesis itself turns out to be meaningful later when I talk about delay and advancement of time, that is, if the velocity, not the transmission velocity, is high, the physical time slows down <the velocity of an object, not the transmission velocity, is inversely proportional to its inner physical time> , because the common period of time the two objects are in interaction is measured to be longer, and if the velocity is small, the physical time advances

faster and the same mathematical period of time is measured to be shorter), then the so-called "law of momentum conservation" as: $m_1 \cdot v_1 + m_2 \cdot v_2 = m_1 \cdot v_1' + m_2 \cdot v_2'$ follows from the last formula above, and in case of imperfect elastic collision, they introduce elastic coefficient which allows to calculate only the velocity of rebound of each object, but not the real forces that will act and react on the objects. If we ask today's physicists what are the real acting and reacting forces between the two dynamically moving objects, most of them answers the acting and reacting forces are the same, because $F_1 = -F_2$. But this is Not true. In other words, today's conventional physics does not know what real forces will act and react on each of two airplanes flying at different velocities at the moment of collision process.

Let us further verify if anti-entropy process can take place in case of imperfect elastic collision. In other words, we will see if the coefficient of an imperfect collision between 0 and 1 could forbid $F_2 > F_1$ even in case $v_1 > v_2$.

$$-\frac{v_1' - v_2'}{v_1 - v_2} = \mu$$

As
$$0 < \mu < 1,$$

$$0 < -\frac{v_1' - v_2'}{v_1 - v_2} < 1$$

$$0 > \frac{v_1' - v_2'}{v_1 - v_2} > -1$$

As we treat the case $v_1 > v_2$:

$$v_2' > v_1', \qquad 2 \cdot v_2' > 2 \cdot v_1' \qquad \text{(a)}$$

$$v_1' - v_2' > v_2 - v_1$$

$$v_2' - v_1' < v_1 - v_2$$

$$v_2' + v_2 < v_1 + v_1' \qquad \text{(b)}$$

If we subtract (b) from (a), we get:

$$v_2' - v_2 > v_1' - v_1 \qquad \text{(c)}$$

As we are to prove that $F_2 > F_1$ may hold under the condition (c), we verify if

$$m_2 \cdot \frac{v_2' - v_2}{\Delta t_2} > m_1 \cdot \frac{v_1' - v_1}{\Delta t_1}$$

$$\frac{m_2}{\Delta t_2} \cdot (v_2' - v_2) > \frac{m_1}{\Delta t_1} \cdot (v_1' - v_1) \qquad \text{(d)}$$

As the acting force disappears when the action/reaction is over, it is reasonable to suppose:

$$\Delta t_2 = \Delta t_1 \qquad \text{(e)}$$

So comparing (c), (d) and (e), we conclude that the left hand side of the formula (d) always has a possibility of becoming bigger than the right hand side, and if only:

$$m_2 \geq m_1$$

holds, the left hand side of the formula (d) is assured to become bigger than the right hand side. Thus the possibility of anti-entropy process is always assured.

If the third law of thermodynamics of monotonic entropy increase were right, why can solar systems and all the stars in the sky continue to subsist?! If the monotonic entropy increase were right, all the stars would be powdered into smaller and smaller particles and would uniformly fill the universe. But this does not happen. Gravity is acting and even new galaxies are being created. Energy is being concentrated and being dissipated here and there, instead of always dissipating uni-directionally. This is the process that is really happening.

With Prof. Smirnov's proposal of true Newton's third law, the concept of entropy has become applicable to real physical processes and even biological processes. The reason why "invasion of physics into biology" declared more than 50 years ago has never succeeded at all in transforming biology into an exact science, is that modern physics itself is not exact at all, but totally and systematically wrong, as it forbids anti-entropy.

I fully agree also to Prof. Smirnov's emphasis that physics should study the real process of action/reaction instead of tracing only states and state transition, which are often probabilistic.

Another excellent fundamental proposal Prof. Smirnov made was the following formula he experimentally derived, by criticizing Boltzmann.

$$\ln \frac{n}{N-n} - \ln \frac{n_p}{N-n_p} = a_p \left| \frac{D-D_p}{D_p} \right|^{k/2} \qquad (2)$$

Boltzmann's logarithmic entropy is probabilistic. Information entropy most scientists in U.S., Europe, and Japan use, is probabilistic too, Prof. Smirnov's logarithmic non-probabilistic entropy shows not only "synergy" but also can serve for guiding the direction of search in learning from data in artificial intelligence. Later in this dissertation, I will show another derivation of this equation from my theories of physics, and still later, I show that this equation transformed into GMDH means that GMDH (Group Method for Data Handling: learning network based on high-order polynomials) can be seen as a universal learning template in our world of action/reaction processes.

Prof. Smirnov wrote in his book "INSIGHT: Crisis of Today's Physics: " on page 66: "If we succeed in creating dynamics of field process, new perspectives will be opened in understanding electrodynamics." This thesis is an attempt to create theories of field process, applying the very

Newton's third law of action/reaction to hidden electron-positron pairs in the vacuum, whereby I adopt a plausible hypothesis that the vacuum space is an "ocean of hidden electron/positron pairs".

Plank constant measured by R. Millikan in his experiment of photoelectric effect as $E = h\nu - W$ is the constant of energy unit that is additionally transmitted every time he increased the frequency of oscillation by one per second. This is not statistical. Plank himself did not intend to introduce statistics with Plank constant into modern physics at all, either. But the conventional interpretation of Plank constant by modern physics turned out to be statistical, and they formed Heisenberg's uncertainty principle as a statistical concept, believing that the value of time and energy, or the value of distance and momentum are randomly biased to positive and negative direction. This is the reason why Prof. Smirnov criticizes Heisenberg's uncertainty law, because the statistics randomly biased to positive or negative direction destroys cause-consequence relation. Prof. Smirnov's criticism against Heisenberg's uncertainty principle is perfectly right. I modify Heisenberg's uncertainty principle as having time direction, that is, as respecting the causal relation. In other words, I refuse the statistics randomly biased in positive or negative direction. By applying Newton's third law of action/reaction to hidden electron-positron pairs in the vacuum, which is the media of electromagnetic waves, that is, light, I will explain in this thesis the action/reaction process of causal relation in the light phenomena.

I introduce the concept of micro-oscillation of physical time. The fact that the graph of the physical time, if seen from a distance, is like a step-function, serves for explaining the discreteness, that is, quantumness of physical phenomena in micro-world. And the fact that the graph of the physical time, more precisely, is not exactly a rectilinear step-function but a sine curve generated by a circle rotating at a constant speed, serves for explaining the randomness, that is, noise, that is happening in micro-world.

$$t' = t - \frac{\hbar}{\pi \cdot m_e c^2} \cdot \sin\left(\frac{2\pi \cdot m_e c^2}{\hbar} \cdot t\right) \qquad (3)$$

$$\frac{dt'}{dt} = \frac{1 - \cos\left(\frac{2\pi \cdot m_e c^2}{\hbar} \cdot t\right)}{1 + \cos\left(\frac{2\pi \cdot m_e c^2}{\hbar} \cdot t\right)} = \tan\left(\frac{\pi \cdot m_e c^2}{\hbar} \cdot t\right) \qquad (4)$$

$$\frac{d^2 t'}{dt^2} = \frac{\pi \cdot m_e c^2}{\hbar \cdot \cos^2\left(\frac{\pi \cdot m_e c^2}{\hbar} \cdot t\right)} \qquad (5)$$

This introduction of the concept of micro-oscillation of physical time, rather stubborn because of

its simplicity, is efficient in eliminating several probabilistic and statistical rubbish and junks from modern physics. Here the concept of mathematical time and physical time is only 2 dimensional, but later in this thesis I will extend it to 3 dimensional, and I will extend the oscillation concept to space and mass, too, just as Prof. Sunden's theories of Time-Space-Oscillation. The perfect success in deriving the equation of Compton scattering in my Thesis "Deterministic Physical & Intelligence Learning based on Consecutive Entropy Decrease", by supposing an advance of time by an electron and by supposing "One Rotation One Action", was one of the reasons why I developed time theories with screw-structured particles.

In order to explain the extremely high anti-entropy processes in biological and intelligent activities and to entirely restructure modern physics, fully using the concept of action & reaction in Newton's Third Law that Prof. Anatoly Pavlovich Smirnov pointed out, the concept of physical Time has to be still further elaborated. For this purpose, the theories proposed by Prof. Olof Sunden in his book "Time-Space Oscillation", Dr. J. G. Klyushin's supposition "Mass creating electron rotates covering torus which is topological production" and "it is possible to say that positive electric charge simply means inverse rotation: electron whirls <<left>> and positron whirls <<right>>", the experimental results and the model proposed by Dr. A.E. Akimov & Dr. G.I. Shipov in " Torsion Fields and Their Experimental Manifestations", and the late Prof. N. A. Kozyrev's works about time, have been useful. Dr. Ph. M. Kanarev's idea that an electron has a ring structure in "The Source of Excess Energy from Water", and DR. A. A. Nassikas's idea that an anti-particle has negative time has also given me hints.

Prof. Sunden's Time-Space-Oscillation shows wonderful explanation of several physical constants using only π, the Plank constant $\hbar$, and the velocity of light c. In my theories, time is now rather "creative" just like Prof. Sunden's but is not the same as that of Prof. Sunden's. In my theories too, the Plank constant $\hbar$ is the action constant just as in Prof. Sunden's theories of Time-Space-Oscillation. But Plank's "action" constant and the action in the sense of Newton's third law are different in time dimension. The former "action" has a square of [sec] more than the latter. I will later explain why this is justifiable.

I. Phase I: What I imagined with Negative Time Before Discovery of Screw-Model
[Those who want to know the final status of my theories first, are advised to read the first chapters of Phase II first up to the chapter "No <Quark> exists", and then skip to Phase III.]
Action/reaction and the creative time
  Action and reaction (= interaction) should determine the value of the new time phase and time direction, which is necessary to "turn quantity into quality" at the moment of action/reaction

process. It seems to me that I have not succeeded in finding out phase description in Prof. Olof Sunden's work. He gives a very interesting list of important parameters, but to my regret, with Average amplitude of oscillation, and writes (P.29, l.22): "The particle, thus formed, is endowed with a Statistical phase dependency." To my much regret, I fear that in the very end, he might yield ground to statistics. I refuse statistics and probability theories up to the very end.

Based on Kozyrev's experimental result of action/reaction process:

$$\frac{\delta x}{\delta t} = \alpha \cdot c \qquad\qquad (6)$$

where α is fine structure constant, c the velocity of light, δx the always non-zero distance from the point on the acting object to the point on the reacting object, and δt the always non-zero time interval to be elapsed for the action to be communicated to the reacting object along the "course of time", I reason according to this formula that at the moment of action/reaction process, the Phase of space and time are set identical. Thus, for instance, rotation of an object in the 3 dimensional space corresponds to rotational cause-result link of time in the 3 dimensional time. As a consequence, in my theories of physics the fundamental dimension is only Time [S], while Prof. Sunden used two fundamental dimensions: Space [M] and Time [M]. Consideration about dimension is useful especially to see if there is phase difference in a composed physical parameter.

Prof. Sunden wrote (P.30):

> Waves traveling inwards from the horizon of large r at the right time, don't look strange if considered in the light of TSO (= Time-Space-Oscillation).

I explicitly admit "negative time" that advances from the future to the past, from the consequence to the cause, if only its timing of event is identified. Even modern physics contradictorily admits and applies Lorentz invariance to their particle theories for no reason of their own that they themselves cannot justify. Lorentz invariance allows right and left coordinate systems, negative time, and rotation. Based on Kozyrev's experimental results of time behavior at the moment action/reaction take place, which is physically concretizing Lorentz transformation, I agree that the "course of time" produces minor anti-clockwise rotational force on the acted object and the positive time flow (cause happens before consequence) from the acting object to the reacting object, whereas the **action** occurs **in expectation of reaction** coming back from the reacting object, that is, **before** the communication of the action reaches the reacting object, the actor is communicated of the reaction. In this way, the reacting object located in the future is communicating with the acting object located in the past. Thus action and reaction do not get into recurrent action/reaction cycle (otherwise never-stopping action and reaction cycle would be

recurrently amplified). In this normal action/reaction process, the electron-positron pair in the vacuum that plays the role of mediating the communication of action/reaction process, is superposed and united (and has almost no mass because positive mass of the electron and negative mass of the positron compensate each other), and together rotates in anti-clockwise direction (if seen from action side).

Negative time axis and negative mass

This concept of negative time allows us to explain Einstein-Podolsky-Rosen's paradox, that is, the so-called "quantum link" as non paradox. They are talking about particles and anti-particles. It is natural that an anti-particle like a positron knows the consequence before the cause.

From Kozyrev's equation: $\frac{\delta x}{\delta t'} = \alpha \cdot c$ where t' is the physical time, I derive the following relation of time-space phase:
$$\delta x = \alpha c \cdot \delta t'$$

$$\int \delta x = \alpha c \cdot \int \delta t'$$

$$x = \alpha c \cdot t' + C$$

At the moment of the creation of the universe, time and space would have been created at the same time. So when $t' = 0$, $x = 0$ and the integral constant $C = 0$.

Thus the relation of time-space phase is:

$$x = \alpha c \cdot t' = \alpha c \cdot (t - \frac{\hbar}{\pi \cdot mc^2} \cdot \sin\left(\frac{2\pi \cdot mc^2}{\hbar} \cdot t\right)) \qquad (7)$$

Action/reaction can go in any direction in the space, so it is reasonable that the time world is also 3 dimensional. When a rotation takes place in the 3 dimensional space, a rotation will take place in the 3 dimensional time world.

Heisenberg's uncertainty relation modified to respect the causality is:

$$\delta x \cdot \frac{\delta(mx)}{\delta t'} = \hbar, \quad \delta x \cdot \delta p = \hbar \quad \text{where we treat the case starting from} \quad p = 0 \quad \text{when} \quad t = 0$$

into which I introduce Kozyrev's relation:

$$\int dx\, dp = x \cdot p = N \cdot \hbar$$

$$x \cdot mv = x \cdot m \frac{\delta x}{\delta t'} = N \cdot \hbar$$

$$x \cdot m \cdot (\alpha c) = N \cdot \hbar$$

$$m \cdot x = m(t') \cdot x(t') = N \cdot \frac{\hbar}{\alpha c}$$

By introducing the equation of time-space relation (7), we get:

$$m(t') = \frac{N \cdot \dfrac{\hbar}{\alpha c}}{x(t')} = \frac{N \cdot \dfrac{\hbar}{\alpha c}}{\alpha c \cdot t'} = \frac{N \cdot \dfrac{\hbar}{\alpha^2 c^2}}{t'} \qquad (8)$$

$$m(t) = \frac{N \cdot \dfrac{\hbar}{\alpha^2 c^2}}{t - \dfrac{\hbar}{\pi \cdot m_e c^2} \cdot \sin\left(\dfrac{2\pi \cdot m_e c^2}{\hbar} t\right)} \qquad (8')$$

Therefore, if a particle has negative time, that particle should have negative mass. But as in that case, space $x(t)$ and time t are also negative, an anti-particle behaves just like a particle in the free space.

According to Dr. A. A. Nassikas, all anti-particles have negative time. According to me, a positron, the important constituent of the vacuum has negative time. Rotation of anti-clockwise spiral produces positive time flow inside the spiral, whereas rotation of clockwise spiral produces negative time flow inside. An electron has an anti-clockwise spiral structure, whereas a positron has a clockwise spiral structure. Thus in whichever direction they may rotate, an electron contributes to advance the time in the positive direction, whereas a positron having negative time axis, contributes to reverse the time in the negative direction.

Dr. J. G. Klyushin wrote in his "A Field Generalization for Lorentz Force Formula":

> Let us cite characteristic opinion in Feynman lectures: "Two possibilities: <<a loop moves>> and <<a field changes>> are indistinguishable in formulation of <<flow rules>>." Nevertheless in order to explain the rule in these two cases we use two quite different methods: Lorentz formula for moving loop and Faraday law for changing field. We know in physics no other example when a simple and accurate law needs for its real understanding an analysis in terms of two different phenomena. Usually such a beautiful generalization opens to issues from a common deep basic principle. But in this case some very deep is not seen.

I think the "deep principle" lies in time theories.

Dr. J. G. Klyushin supposes "Mass creating electron rotates covering torus which is topological production…" and "…it is possible to say that positive electric charge simply means inverse rotation: electron whirls <<left>> and positron whirls <<right>>". I think the emerging mass is an excited electron and a positron coming out from inside the vacuum, and is obtainable instead of "creating" them from null. Not only negative and positive electrical charge but also positive and negative mass are related to whirling <<left>> and whirling <<right>> respectively, which

corresponds to advancing the time and going back the time respectively. We should identify the orientation of rotation of an electron and a positron in action/reaction processes.

Dr. A. Frolov talks about negative time carried by an "anti-photon". For me, neither photon nor anti-photon exists. The so-called photon is nothing more than the wave of aligned interacting electron-positron pairs, the slight polarization (thus almost zero but non-zero "exist-oscillating" mass) and the time oscillation direction (magnetic field direction) of which are perpendicular to the direction of light. This fully explains the two aspects "wave" and "particle" of a so-called "photon" of Copenhagen doctrine, which in fact is the particle "electron-positron pair" and is the wave carried by the electron-positron pairs in the vacuum. The carrier of negative time is the positron, and we do not need anti-photon.

According to Newton's action/reaction law, Kozyrev's "course of time", and modified Heisenberg's uncertainty principle, mass is in inverse proportion to the time. Therefore, positive mass of a particle does not disappear sporadically in its trajectory, so long as it does not encounter negative mass. Mass looks as if disappearing sporadically ("exist-oscillate" according to Prof. Sunden's terminology) and produces "tunnel effect", only because it periodically moves at an infinite speed because of the micro-oscillation of physical time, as I stated it in the Conference of HYPOTHESIS-III in July 1999 and in my former thesis. On the other hand, I admit negative mass.

Negative time is embodied in the anti-particle positron, which having negative mass and negative.time coordinates, behaves just like particles (if you push it, it is pulled as the mass is negative, but moves in the pushed direction because the coordinates are negative). The notion of negative mass along with the electric charge as phase difference of the mass compared with the space surrounding it, explains the mass constitution of a neutron and a proton. A neutron collapses into a proton and an electron (approximately if we ignore the other minor particle), seemingly by emitting an electron. However, when we analyze the constitution of the coming-out proton, that is, when we observe what particles come out in case of decay of proton, we find a neutron and a positron. Though we observed only an electron leaving a neutron, the resulting proton has a positron inside. And the mass difference of a neutron and a proton is almost twice the mass of an electron (or the sum of the absolute mass of an electron and a positron) or more. An electron's leaving signifies the reverse arrival of a positron along the negative time axis, and the negative mass of the positron appears inside the proton. The reason why a proton is a stable particle, and the decay of proton is quite rarely observed is that the constituent positron is turning the time backward. Later I surmount this quantitative explanation, by introducing structures of anti-clockwise and clockwise outer electric spirals and clockwise and anti-clockwise

inner mass spirals of an electron and a positron respectively. The reason why it takes possibly infinite time for a proton to decay is that the ring of the spiral string of its positron is linked with the ring of the spiral string of its nucleon. In case of decay of a neutron, the electron captivated inside the nucleon does not leave the neutron but gets "inside-out" to turn into a positron, and it is the electron of an electron-positron pair of the vacuum that looks as if leaving from the neutron, where the broken positron of the former electron-positron pair is turned into a neutrino, because its spiral string is broken..

Both Time Delay and Time Advancement are contributing to produce **ANTI-ENTROPY processes** in Different Locations (in case of time delay, in the middle of the motion, and in case of time advancement, at the end of the motion), by respectively diminishing or increasing the action transmission velocity of the acted particle. The anti-entropy processes produced by time delay or time advancement are playing an important role in concentrating energy in the solar system and biological systems.

Gravity inversely proportional to the square of the distance

The gravity, that is produced by the action/reaction process directly acting on the existence of mass, is a fundamental force. Coulomb force is another variety of the gravity. Dynamics of gravity represents the dynamics of all sorts of field processes. (N.B.: Later, I will modify this view point. Coulomb force and gravity are equally fundamental.)

Now I show why gravity is inversely proportional to the square of the distance (which is the same for Coulomb field, because electric charge is a sort of mass, resulting from the phase difference between the mass and the surrounding space) and in the centripetal direction:

$$F = \frac{d(m \cdot v)}{dt'} = \frac{dm}{dt'} \cdot v \ + m \cdot \frac{dv}{dt'} \qquad (9)$$

By introducing the relation (8), (7) and (3), in the macro-world where the effect of micro-oscillation of time is negligible (because the mass m in the equation (3) is gigantic):

$$F = -\frac{N \cdot \frac{\hbar}{\alpha^2 c^2}}{t'^2} \cdot \frac{dx}{dt'} + \frac{N \cdot \frac{\hbar}{\alpha^2 c^2}}{t'} \cdot \frac{d}{dt'}\left(\frac{dx}{dt'}\right)$$

$$= -\frac{N \cdot \frac{\hbar}{\alpha^2 c^2}}{t'^2} \cdot \alpha c + \frac{N \cdot \frac{\hbar}{\alpha^2 c^2}}{t'} \cdot 0$$

$$F = -\frac{N \cdot \frac{\hbar}{\alpha c}}{t'^2} = -\frac{N \cdot \frac{\hbar}{\alpha c}}{\frac{x^2}{\alpha^2 c^2}} = -\frac{N \cdot \hbar \cdot \alpha c}{x^2} \qquad (10)$$

Thus, the acting force in the interaction, that is, the gravity, is inversely proportional to the

square of the distance and in the centripetal direction. We can also say that, as mass is inversely proportional to time, that is, distance in space according to the equation (8), the gravity is proportional to the product of two masses acting on each other, if we put:

$$m_1 = \frac{N_1 \cdot \frac{\hbar}{\alpha^2 c^2}}{t'} = \frac{N_1 \cdot \frac{\hbar}{\alpha c}}{x} \quad , \qquad m_2 = \frac{N_2 \cdot \frac{\hbar}{\alpha^2 c^2}}{t'} = \frac{N_2 \cdot \frac{\hbar}{\alpha c}}{x}$$

Hence, $\qquad m_1 \cdot m_2 = \dfrac{N_1 N_2 \dfrac{\hbar^2}{\alpha^2 c^2}}{x^2}$

By introducing this into (10), we get:

$$F = -\frac{N}{N_1 N_2} \cdot \frac{\alpha^3 c^3}{\hbar} \cdot m_1 m_2 \qquad\qquad (10')$$

This means that the gravity is proportional also to the product of mass of two objects pulling each other. But we should remember that (10) or (10') holds only in case the two objects are stably keeping the distance from each other, because, notwithstanding the fact that the object may move in different direction than that of the solar system against the ether, we approximately put in the above derivation:

$$v = \frac{dx}{dt'} = \frac{\delta x}{\delta t'} = \alpha \cdot c$$

and $\qquad \dfrac{d}{dt'}\left(\dfrac{dx}{dt'}\right) = \dfrac{d}{dt'}(\alpha c) = 0$

In case, the distance between the two objects is not stable, the force acting on the object of mass m_1 and the force reacting on the object of mass m_2 are not equal, and have different values determined according to the equation (1) of action/reaction.

(There is no special strong force of interaction inside the nucleus. In a narrow space like inside the nucleus of an atom, the gravity is extremely amplified by $\dfrac{dt'}{dt}$, that is, the so-called "strong interaction" is nothing more than the gravity and the Coulomb field amplified by $\dfrac{dt'}{dt}$, and in a still narrower space, the second term in equation (9) takes effect and produces centrifugal force. Later I refute this viewpoint, though which is somewhat similar to Prof. Sunden's, and show that the spiral structure of a neutron that captivates an electron inside, enables to locate the electron at an unexpectedly 10 times smaller distance from the positron of the proton. The so-called "strong-interaction" believed to be 100 times stronger than electromagnetic forces does not exist and is nothing more than the electro-magnetic forces.)

What I imagined (and later refuted) before I created the screw model

Electric charge is essentially the same thing as mass (in that both electrical charge and mass are represented and produced by anti-clockwise and clockwise spirals. The viewpoint described in this paragraph will be surmounted later by the spiral or screw model, but I think it would be meaningful to describe here the first step toward that finally inspired screw model. Moreover, in the screw model, the electrical spiral if put inside another electrical spiral, can be used as a mass spiral). That a particle or anti-particle with mass is electrically charged, signifies that the phase of the mass of that particle or anti-particle is shifted or different from the phase of the space surrounding them. This explains that the Coulomb equation and gravity equation have almost the same form, that is, the forces are in inverse proportion to the square of the distance and in centripetal direction (in case of Coulomb force, the force is centripetal when the signs of electrical charge are different). Thus the dimension of electrical charge is the same as the dimension of mass (while Prof. Sunden wrote the dimension of electrical charge is the same as the dimension of space). I further elaborate the concept of electric charge, its relation to mass.

Table 1

	+ and -, or – and +	- and -, or + and +
Coulomb Force	centripetal	Centrifugal
Gravity	centrifugal	Centripetal

(In today's physics, gravity only between + and + is recognized.)

As we see in the table 1, gravity is centripetal when the mass has the same positive or negative signs and is centrifugal when the mass has different signs, whereas Coulomb force is centripetal when the electric charge has different sign and is centrifugal when the electric charge has the same positive or negative signs. If we want to use a unified equation of gravity-Coulomb force, it becomes necessary to perceive the extended concept of mass as having a structure of complex number $m + i \cdot km$ where m is the mass, i the imaginary number, and k is some coefficient depending on the situation like electric field, etc. that turns a part of the mass into the electric charge, which can be considered as "imaginary mass". With this "vectorial" mass, the equation of gravity and that of Coulomb force can be combined and can be written as:

$$F = -G \cdot \frac{(m_1 + \frac{k_1}{4\pi G \varepsilon_0} m_1 \cdot i) \cdot (m_2 + \frac{k_1}{4\pi G \varepsilon_0} m_2 \cdot i)}{r^2}$$

where the numerator is the product of the vectorial mass, G is the gravitational constant, ε_0 dielectric constant of the vacuum, and r the distance between the electrically charged objects of mass m_1 and m. Further below, I will elaborate this equation for the case in which the two objects are moving in linear motion and in rotation.

I have explained why a simple rotation of an object can increase or decrease mass. When we take into account Einstein's equation of mass, modifying its weak point that the mass will become infinite when the velocity of a particle attains the velocity of light, and using the frequency of the micro-oscillation of the physical time I introduced in the equation (3), a dynamic definition of mass will be:

$$\frac{m + i \cdot km}{\frac{1}{2} \cdot \left(\frac{\omega}{\frac{m_e c^2}{\hbar}} + \sqrt{1 - \left(\frac{v}{c}\right)^2} \right)} = \frac{m + i \cdot km}{\frac{1}{2} \cdot \left(\frac{\hbar \omega}{m_e c^2} + \sqrt{1 - \left(\frac{v}{c}\right)^2} \right)} \qquad (11)$$

where m_e is the mass of an electron, and ω is the frequency of rotation of the object, which is then divided by the frequency of the micro-oscillation of the physical time.

A dynamic definition of gravitational/Coulomb force is:

$$F = -G \frac{(m_1 + i \cdot \frac{1}{4\pi G \varepsilon_0} e_1) \cdot (m_2 + i \cdot \frac{1}{4\pi G \varepsilon_0} e_2)}{\frac{1}{2^2} \cdot \left(\frac{\hbar \omega_1}{m_e c^2} + \sqrt{1 - \left(\frac{v}{c}\right)^2} \right) \cdot \left(\frac{\hbar \omega_2}{m_e c^2} + \sqrt{1 - \left(\frac{v}{c}\right)^2} \right) \cdot r^2}$$

This signifies that in general, a force has an imaginary part, which means a rotational force. A positive imaginary part means a counter-clockwise rotational force, and a negative one means the clockwise.
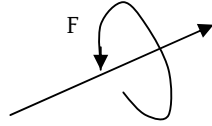
We take for an example the case of gravitational/coulomb force between an electron and a positron, in which case:

$$m_1 = m_{e^-} = -m_{e^+} = m_2$$

$$e^- = -e^+$$

If we multiply the two components of the numerator, the imaginary part

$$\frac{2 m_{e^-} \cdot e^-}{4\pi G \varepsilon_0} \cdot i$$

remains. This means that when we put an electron and a positron facing each other at a certain distance, they get this rotating force and begin to rotate of themselves.

Thus Newton's third law (1)

$$F_1 \cdot v_1 = -F_2 \cdot v_2$$

becomes still further comparable to a lever and a screw. If F_1, v_1, F_2, and v_2 are set on a straight line, Newton's third law allows the reaction to reverse the sign of the action, generating a clockwise rotating reaction from the counter-clockwise rotating action.

I add here what is the relation between the equation (8) or (8') and the formula of mass in (11). Mass is equivalent to an imaginary electric charge or an electric charge is equivalent to an imaginary mass, and that the time in (8) or (8') signifies the time necessary for the action/reaction and the mass in the equations (8) or (8') signifies mass or electrical charge information carried by the time or the space distance of the action/reaction, whereas the mass or the electrical charge in the formula (11) signifies the mass or electrical charge observed at zero distance at an exact time point.

Between a non-dielectric macroscopic object and a non-dielectric macroscopic object containing, of course, many electrons and positrons, electrical centripetal and centrifugal forces cancel each other, and it is only the gravitational forces that remain in effect. The reasons why, though much weaker than electrical forces, the gravitational forces survive are: first that in our universe there is much more matter than anti-matter, and second that the gravity is a force that pulls mass of the same sign (centripetal force between positive and positive, or negative and negative mass). But we should be aware that, though the effect of gravitational forces survives, the orientation of the rotation of objects is according to the "stronger screw", that is, the anti-clockwise electrical spiral of matter (but not the clockwise mass spiral of matter). The reason is that according to the principle of "screw" and "lever", the electrical spiral having far less gradient, that is, a far more winding density is stronger.

Attention! Later I will show that there is no need to introduce all these imaginary numbers to explain electricity and mass, but I have not omitted the aforementioned chapter in order to show the itinerary toward the discovery of the screw model.

II. Phase II: Discovery of Screw-Structured Particles, before precise quantization
[Those who want to know the final status of my theories first, are advised to read the first chapters of Phase II first up to the chapter "No <Quark> exists", and then skip to Phase III.]
Transmission Velocity of action and slightly rotating force
 An **action** occurs **in expectation of a reaction** <u>coming back from the reacting object, that is,</u> **<u>before</u>** <u>the communication of the action reaches the reacting object, the actor is communicated of the reaction</u>. In this way, the reacting object located in the future is communicating with the acting object located in the past. Thus action and reaction do not get into recurrent

action/reaction cycle (otherwise never-stopping action and reaction cycle would be recurrently amplified, which is a contradiction).

   I here explain action/reaction processes of objects that interact each other, such as by collision, by electric field, and by gravitational field. This action/reaction normally communicates at the finite speed $\alpha \cdot c$.

   First, action communication is sent out from the acting object, aiming at the reacting object. It takes time before the action supported by a chain of counter-clockwise rotating electron screws of electron-positron pairs of vacuum reaches the reacting object, because the electron screws rotates at a finite speed. The reacting communication, supported by a chain of counter-clockwise rotating (seen from the side of the acting object) positron screws of electron-positron pairs comes back to the acting object, entirely going back the time. Thus the acting object knows the reaction when it sends out the reaction. The reason why the action produces slightly anti-clockwise rotating force is that the electron/positron pair on the action/reaction trajectory, that is, each of the communicating spiral chains of electron-positron pairs (anti-clockwise spiral in case of the electron chain, and clockwise in case of the positron chain), turns anti-clockwise, advancing forward and backward respectively in the opposite direction in time & space.

   It is known that $\dfrac{1}{2\pi} \cdot \dfrac{\delta x}{\delta t} = \dfrac{\alpha \cdot c}{2\pi}$ is equivalent to the speed of the solar system moving in the

static ether.   Distance $\dfrac{\alpha \cdot c}{2\pi} \cdot \delta t$
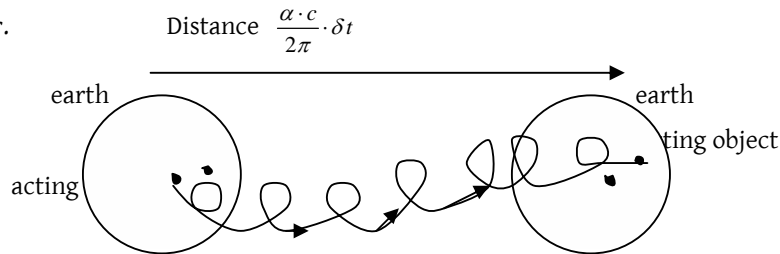
The straight line distance between the acting and reacting objects is $\dfrac{\alpha \cdot c}{2\pi} \cdot \delta t$ but the real distance the action goes along is 2π times more and is equal to $\alpha \cdot c \cdot \delta t$. This difference of distance comes from the structure of the spiral and Kozyrev's equation signifies that One Action corresponds to One Rotation, that is, rotation of 2π radian.

Time necessary for an action based on the physical time of the vacuum, will be measured by the number of electron-positron pairs of the static vacuum ether that rub particles passing by, which is caused by the solar system advancing at the speed $\frac{\alpha c}{2\pi}$ in the ether (more precisely, the static ether) of electron-positron pairs.

Screw model of the outer electric spiral and the inner mass spiral

If we attempted to explain gravity by dielectric effect taking place on the object in the action/reaction field, it fails, because if gravity were a consequence of dielectric effect, then all the metals letting out free electrons should be far heavier than other substances. Moreover, if we consider two objects under no dielectric effect nor in electric field, the dielectric effect caused by electrons and positrons inside the objects, cancel each other.

In order to explain mass and gravity, whereas the signs of an electrical charge and mass play the opposite role in producing centripetal and centrifugal forces, we should introduce different structures. Just as an electrical force is produced by the rotating chains of electron-positron pairs in the vacuum, gravity is also produced by the rotating chains of electron-positron pairs in the vacuum. We have seen that the **anti-clockwise spiral** of the **electron** represented a **negative electrical** charge, and the **clockwise spiral** of **positron** a **positive electrical** charge. In the domain of mass, instead of the electrical charge, **positive mass** of the electron has **Clockwise spiral**, and the **negative mass** of the **positron** has **Anti-clockwise spiral**. "Clockwise" and "anti-clockwise" become the opposite. This explains why mass of opposite sign (positive and negative mass) pushes away each other, and mass of the same sign pulls each other, just as electrical charges of the different signs pull each other, while electrical charges of the same sign pushes away each other. In addition to that, we can say that those spirals of **mass** have far **sparser** windings than those of **electrical** charge, because gravity is a force far weaker than electrical force. We can say this according to the concept of a lever and a screw.

We can even suppose that while the **outer spiral** playing the role of **electrical charge** and the **inner spiral** playing the role of **gravity**, the **connected** two spiral strings of outer electrical charge and of inner mass, form a **single ring**. When the single spiral string of a particle or anti-particle breaks down, they will each be reduced to neutrinos, i.e., a neutrino is a destroyed form of the spiral string. And in most cases, neutrinos are produced by destroying the spiral string of the electron-positron pair of the vacuum. The reason why a neutrino passes through any substance with so little interaction with other particles is that it has that broken string-structure. Moreover, as a neutrino produced by destroying an electron or a positron has a broken single string (therefore, its motion is outside the framework of electrical and gravitational action/reaction. Please remember that even "photon" = electron-positron pair

carrying electromagnetic wave is constrained by electrical and gravitational action/reaction), a neutrino would be able to slide along a chain of electron-positron pair of the vacuum at a very high velocity, without hooking the electron/positron of the vacuum, i.e., without giving "Cherenkov scintillation". Its velocity may possibly surpass that of light. In other words, a neutrino can become a tachyon.

electron

anti-clockwise
outer spiral
for electrical
charge

clockwise inner
spiral for mass
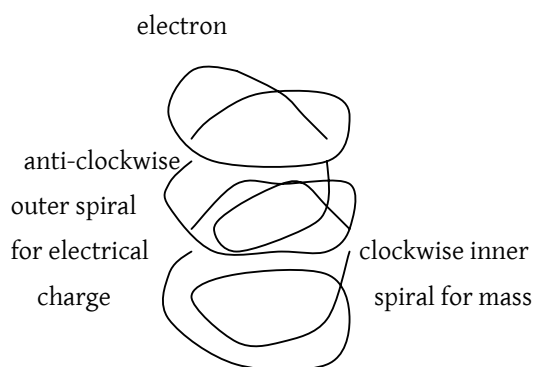
Though recently, some researchers in Japan announced that neutrinos have mass, the "mass" of a neutrino which is nothing but a broken string should not be produced by the normal spiral mechanism of gravity, and the experimentally measured value of "mass" will not always be assured to be the same value. In other words, "mass of a neutrino" believed to have the same value all the time is a fake.

Conventional physicists who have eagerly been looking for a Higgs particle, which, according to their theories, is a particle that GIVES Mass to other particles, begin to complain these days why they do not succeed in finding it. The reason is quite simple and clear. Such a particle like Higgs never exists, and their entire theories that deduced its existence are a fake.

In particles in general, though the length of the spiral string of electrical charge (outside) and that of mass (inside) are kept, that is, the ratio is kept, the spiral string common for electrical charge and mass, can turn around like a belt.

When the anti-clockwise rotating chains of electron-positron pairs carry the action from the electron, the chain touching the electron from outside makes the outer spiral slide ahead, while the chain touching the electron from inside spiral makes the inside spiral slide back. As the inside spiral is far sparser, receiving far weaker force backward than the outside spiral, the electrical force that slides the electron ahead wins and carries the electron ahead. However, the velocity of rotation of the inside spiral is far less, the inside string sags, and the outside part of

the string rotating faster will pull the string. Thus the string will slide like a belt.

The situation is the same for a positron, except the "clockwise" and "anti-clockwise" becoming the opposite.

The structure of a nucleon without an electron nor a positron (though that does not normally exist) consists of an almost straight outer line representing no electrical charge (which will form the particle electron neutrino when separated. A neutrino is only a string not forming a ring and can pass through any substance) and of a long but sparsely winding inner mass spiral, which produce substantial mass.

Vacuum is an ocean of electron-positron pairs

When combined with an electron of positive mass, a positron having negative mass completely disappears, emitting gamma-rays, in the vacuum as if the vacuum has absolutely no mass. Vacuum is an "ocean" filled with electron-positron pairs with no mass. Except in case when the pair of electron-positron is located on a trajectory of light, their axis are exactly superposed.

In fact, a huge amount of gamma-rays is emanated from the center of the galaxy. The center of the galaxy is the axis of the rotation, that is, the axis of a spinning top. According to Newton's third law applied to a screw, the axis of a top is exerted an infinite action, which should be the reason why an electron-positron pair of vacuum located on the axis of the rotating galaxy is disorganized into an electron and a positron, which, then, if combined after floating separately for a while, emits gamma-rays.

On the other hand, a gamma-ray has the capability of disorganizing the pair of electron-positron of vacuum into a separate electron and a separate positron. The "extensive air shower" that falls down to the earth includes "pair creation" of an electron and a positron and several other sorts of particles. Conventional physicists believe that the electron and the positron created in pair in the extensive air shower would have been taken out of some atoms and molecules of the air, but to tell the truth, they are created from the formerly hidden electron-positron pair of the vacuum.

One important question about the structure of each of the electron-positron pair of vacuum is whether, though the axes of the electron and the positron are "superposed" or "aligned", the poles of them are attached, and the electron and the positron are pushing each other all the time with a very strong force. The experiment of Akimov's "communication of infinite velocity" that make the electron and the positron rotate in the opposite angular direction around their axis, shows that the axes of the electron and the positron are not aligned but the bodies and the axes of the electron and the positron are superposed. Another important question about the structure of each of the electron-positron pair of vacuum is whether the spiral strings of the electron and the positron are linked or not linked. If they are not linked, one structural question is how the pair can conserve such a stable single body. Even if they are linked, if the electron and the positron rotate

at the same angular velocity, the two spiral strings with the exactly superposed axes can rotate in the opposite direction (though this would be a rare case) without colliding each other.

We may also have a question about the dynamic process of how the pair is formed. It would have been the electric centripetal force that would have pulled them closer to each other along the aligned axes, rotating the electron and the positron in the opposite angular direction, how could the bodies of the electron and the positron encroach upon each other without destroying the strings of each other. Combining an electron and a positron does not necessarily produce gamma-rays. In other cases, it may produce a pair of neutrinos like: $e^+ + e^- \rightarrow \nu + \bar{\nu}$, which is the case in which the strings of the electron and of the positron are destroyed. This is the reason why I say that neutrinos are special kinds of particles that have broken strings

One Action One spiral rotation

And each One Action emitted by an actor has One spiral Rotation, independent of the distance at which its reactor may be located. In other words, if the acting electron is at a zero distance, the reacting free electron will receive an action of one rotation, though. Therefore, the reacting free electron should rotate at an infinite speed, and pushed away from the acting electron by an infinite force, which explains the infinite centrifugal force that pushes away two negatively electrically charged particles located at zero distance in Coulomb equation. This principle of "one action one rotation" (where "action" is in the sense of Newton's third law) corresponds to the fact that in R. Millikan's experiment one more frequency of electromagnetic wave adds up one Plank constant, i.e., "unit of action".

Only when Axis points to the moving direction, electromagnetic wave is emitted

Prof. Kanarev talked about a "ring" structure of an electron, in order to explain the excess energy and why he reasons that the electron of the hydrogen atom should be stationary without orbital spin. I explain the "excessive energy" with the spiral structure of an electron with an orbital spin and the time mechanism that brings about an **Anti-entropy** process. Here I briefly use the model of screw-structured particles. The **reason why the orbital electron does not emit electromagnetic waves** though accelerated (should emit when accelerated according to the theory of Maxwell's electromagnetics) is as follows. The electron has a screwed structure. When orbiting around the proton, the Axis of the Screw of the electron Points To the Proton, so that the orbital electron could be pulled by the centripetal force from the proton and could stably circulate around the orbit. Maxwell's electromagnetics should be modified to take into account that it is **TYPICALLY WHEN the Direction of the Linear Motion of an electron and the Direction of the Screw AXIS of the electron are the SAME**, that the electron emits electromagnetic waves, if accelerated, and otherwise not. In such a case that the direction of the screw axis of the electron is

perpendicular to the direction of linear motion, even if the electron is accelerated, the electron will never emit electromagnetic waves. This mechanism can naturally be explained by the model of screw-structured particles. In order that an electromagnetic wave could be emitted, that is, all the chains of electron-positron pairs of the vacuum begin to rotate around their own parallel axes which should be parallel to the axis of the electron, the groove of the screw of the electron should clutch the groove of the screw of the electron-positron pair of the vacuum. But if the face of the groove of the rotating electron is pushing forward into the face of the grooves of the bundle of chains of electron-positron pairs of the vacuum, there is no way for the chains of the electron-positron pairs of the vacuum to generate concentric circles of waves in the vacuum. Conventional modern physics hypothesizes that an electron does not emit electromagnetic waves if the electron is circulating along an orbit determined according to the mysterious "quantum condition". Their hypothesis is too ambiguous. **Non emission of electromagnetic waves from the stably spinning orbital electron should structurally be explained, showing how the action takes place**. I will show it later in this dissertation. On the contrary, if the pointing direction of the axis of the orbital electron is disturbed, the orbital electron can emit an electromagnetic wave at any moment, in conformity with quantum dynamics. In any case, with the model of ball-structured particles, it will be difficult to overcome the mysterious "quantum condition", and to explain why the electric charge though accelerated does not emit light, and to tell without a probabilistic misty framework in what case it emits light. The reason why the spiral axis of the orbital electron points to the proton and the electron rotates around it while revolving around the proton in the hydrogen atom is that in general there is a principle that the spiral axis of particles tends to become parallel to the direction of the coming major action, i.e., chaining direction of electron-positron pairs of the vacuum rotating around its axis and carrying the electric action in this case. Another example of this principle is a spinning top, whose vertical rotation axis points to the direction from which its major action, in this case the gravitational action, comes. Similar rotations and revolution of this kind take place in case of the mercury against the sun and the moon against the earth. The clockwise and anti-clockwise spinning direction should be the opposite for the case of an electrical field and for the case of a gravitational field. And once the axis of the rotating object points to the direction of the coming action, the axis stably continues to point to the same direction, because the acting chain of electron-positron pairs of the vacuum clutches the object.

On the other hand, "discreteness" or "quantumness" of the electron orbit of an atom is determined according to Newton's third law of action/reaction and the micro-oscillation of physical time. In conformity with what I wrote about Fermions and Bosons in relation to the quantum version of Newton's action/reaction law, that is, "the wave equation" of Newton's third law in my thesis, Bohr radius is very precisely calculable in the following formula where αc is

the action/reaction transmission speed, that is, the velocity of the solar system against the static ether.

$$\frac{\hbar}{m_e \cdot \alpha c} = 0.52918 \cdot 10^{-8} cm$$

If we equate the above formula and Bohr's formula of the radius,

$$\frac{\hbar}{m_e \cdot \alpha c} = 4\pi\varepsilon_0 \cdot \frac{\hbar^2}{m_e\, e^2}$$

we get:

$$e = \sqrt{2\varepsilon_0\, h\, \alpha\, c}$$

This equation can be viewed to show the substructure of an electron, that is, the winding density of the electric spiral of the electron.

If we rewrite the aforementioned equation:

$$r = \frac{\hbar}{m_e \cdot \alpha c} \qquad \text{as} \qquad (m_e\, r) \cdot (\alpha c) = \hbar \qquad \text{(a)}$$

and compare this with Newton's action: $(m_e\, a) \cdot (\alpha c) = F \cdot v$ where a is the acceleration

and if we remark that in modern physics too there are some researchers who call $\hbar$ as "action" and deem the concept "action" more important than energy, we can see the equation (a) as the one that fills in <u>the gap of dimensional difference of</u> $[time]^2$ <u>between Newton's action and the</u> <u>"action" of the Plank constant</u> $\hbar$. $(m_e\, r) \cdot (\alpha c)$ signifies how many of Newton's action $(m_e\, a) \cdot (\alpha c)$ take place, that is, how many times in a unit period of time an electron of the electron-positron pair of the vacuum rotates (one rotation corresponds to one action) and how many electrons of electron-positron pairs of the vacuum in a chain participated in the transportation of the action emitted by the proton up to the orbital electron of the hydrogen atom. This gap of dimensional difference of $[time]^2$ between Newton's action and the "action" of the Plank constant $\hbar$ will be quantitatively analyzed more precisely from geometrical point of view of action, later in this dissertation.

And in the chapter of my thesis I wrote about Fermions and Bosons in relation to the quantum version of Newton's action/reaction law, that is, "the wave equation" of Newton's third law, I showed $\Delta t = \dfrac{\hbar}{m_e \cdot (\alpha c)^2}$ as the time unit. This $\Delta t = \dfrac{\hbar}{m_e \cdot (\alpha c)^2}$ represents the time necessary for one Newtonian action to take place. If we transform this into:

$$m_e\, (\alpha c \cdot \Delta t) \cdot (\alpha c) = \hbar$$

We can see that the Bohr radius $\alpha c \cdot \Delta t$ is the space distance that the action to be carried at the velocity αc is carried during the period of time necessary for one Newtonian action to take place.

Based on this model of screw-structured particles, I can say that because electron-positron pairs

are hidden in the vacuum, the positive and negative electric charge are recognized, and among all kinds of particles it is ONLY the Electron whose groove of the spiral is exactly clutched by the spiral groove of the electron of the electron-positron pairs of the vacuum that can stably rotate along the orbit around an atom or a molecule.

Atoms are connected by Electrons to stably form a molecule

  Now I explain why atoms could be connected to form a molecule. The bonding between atoms is stably established thanks to electrons (!) held in common between different atoms, though electrons have both negative electrical charges which in free space should push away from each other. Moreover, if electrons were ball-structured, stability of orbital electrons held in common between different protons can never be assured, nor is it possible for the pairs of a proton and an electron to converge to and to get stabilized to the molecular structure with orbital electrons held in common. Contrary to the ordinary supposition that an exchange of circulating orbital ball-structured electrons between different atoms would bring about the bonding, to our surprise, conventional modern physics totally failed in explaining the structure of an atom or molecule more complex than a simple hydrogen atom.

Here, with the model of screw-structured particles, I analyze the case of a hydrogen molecule, more precisely how an ortho-hydrogen molecule is formed and what structure is stably assured. I now reason the stability of the screw-structured model and non-stability of the ball-structured model. In case of the ball-structured model, even if we suppose that a molecular structure, where two electrons at opposite end of the diameter of the circular orbit located at equidistance from the two protons located on the opposite side of the circular orbit of the electrons, rotates along the circular orbit in the same direction, is accidentally formed, if only one of the electrons slightly oscillates and slightly deviates from the orbit, that is, the electron gets slightly nearer to either of the two protons, the electron will deviate still more toward the nearer proton at an accelerated pace, and, having lost the balance, the entire structure of the hydrogen molecule will immediately collapse. In other words, stability of the orbital electron can never be assured. Moreover, this non-stability of the molecule with ball-structured electrons signifies that there is no possibility for a pair of hydrogen atoms to converge to form a hydrogen molecule.

e^-
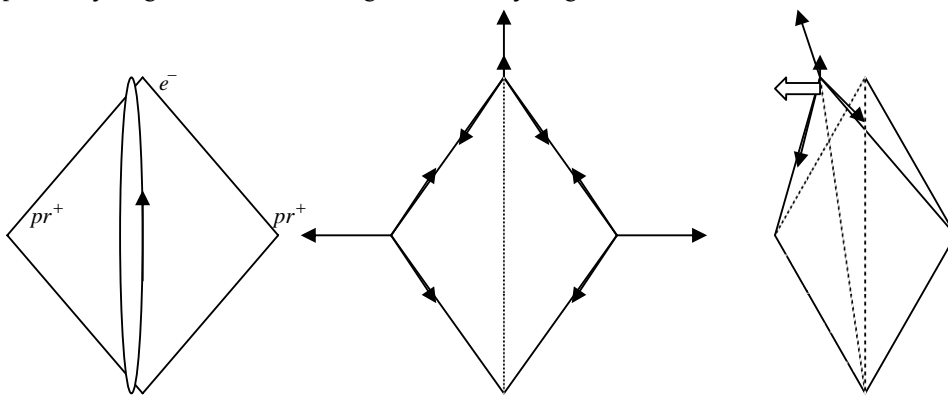
On the contrary, the screw-structured model of electrons, protons, and the electron-positron pairs of the vacuum, is capable of assuring the stability of the structure of the molecule. In the following calculation of the screwed structure of the molecule, I simplified that the chaining between the electron and the proton by electron-positron pairs of the vacuum, that is, the "line of electric force" is a straight line and is not curved. But more in detail, the chaining, i.e., line of electric force is curved. Even with that simplification, you will see that the distance between the protons is rather precisely calculated in case of this screw-structured model. In reality more in detail, as the chaining of electron-positron pairs of the vacuum has the characteristic of trying to recover the straight line (because rotating tops in a chain will resist against zigzagging), which is verified by the fact that the light recovers straight trajectory even after being curved by gravity and by Akimov's and Shipov's experiment of straight communication trajectory, and which on the other hand, produces Faraday's so-called "pressure of electric field" or Dr. Jaroslav. G. Klyushin's "tensity", even if the screw-structured electron gets nearer to either of the protons, the stronger force trying to straighten the strongly curved line of electric force will push the deviated electron back to the orbit located just in the middle. In other words, the stability of the orbit will be assured.
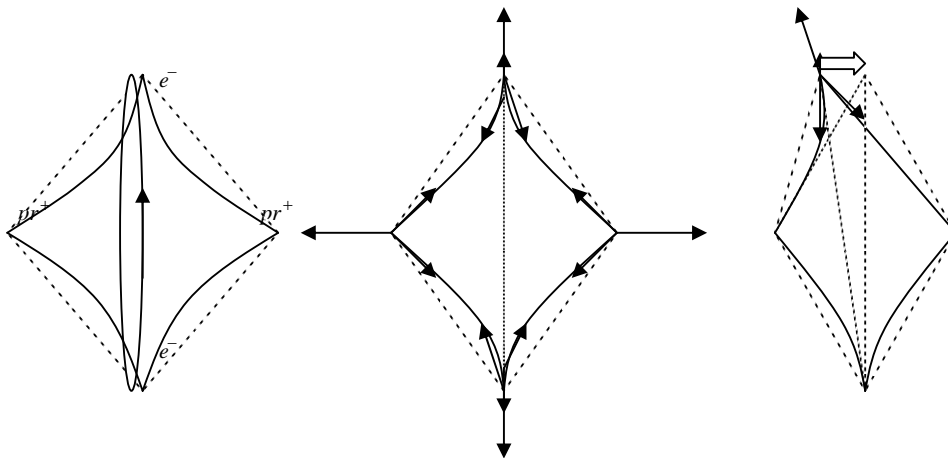
Moreover, when two hydrogen atoms are in the space, as the locations at the end of both of the electron spiral farther from the proton are the "sinks" of the flowing electron-positron pairs of the vacuum ("sink": the necessary electron-positron pairs are provided from the space of the vacuum around the e_1^- and e_2^-, that is, one after another, electron-positron pairs of the vacuum come gathering toward the e_1^- and e_2^-), the two sinks come nearer and nearer to each other, and finally the rotating electrons e_1^- and e_2^- of the hydrogen atoms will touch each other (At the moment of touching of oppositely rotating electrons, the rotation of the electrons may

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instantaneously stop). But at that moment, the electric centripetal force between the proton and the electron is possibly four times more that the electric centrifugal force between the protons because of the distance and the Coulomb force being produced thereof, and the protons rash against the electrons, or better to say, against each other, which bends the aligned axis of the spirals of the electrons e_1^- and e_2^-. Thus, the two electrons thence will behave side by side with the spiral axes in parallel (no centrifugal force between the two orbital electrons in pair), where the two electrons e_1^- and e_2^- rotate in the same (anti-clockwise or clockwise) direction. And thence the two hydrogen atoms connected via the pair of orbital electrons will behave as a molecule. Even if in the process the distance of the electrons from the protons are not equal, above-mentioned "tensity" and "pressure" of the chain of the electron-positron pairs of the vacuum will recover the equidistance of the electron pair e_1^- and e_2^- on the orbit from the protons at the two poles, and dynamically, two separate free hydrogen atoms will converge to form this above-mentioned molecular structure.

When the finally converged structure is formed, a centrifugal force equal in size to $F_2 = \varepsilon_0 \dfrac{e^+ e^+}{(2r)^2}$ is produced between the oppositely rotating protons p_1 and p_2, which is equal in size and opposite in direction to the centripetal force $F_1 = \varepsilon_0 \dfrac{e^- e^+}{(2r)^2}$ between e_1^- and p_1 and between e_2^- and p_2, each of which has now half the normal centripetal potential because not both the electron and the proton are rotating but only the proton is rotating. When the orbital movement of the electrons stops, the protons will begin to fall to the electrons. The above equivalence indicates that at any symmetrical distance r, the protons can be balanced, but the quantumness intervenes here too, because the action rotation has a discrete value. One big question would come to your mind. Why this structure is not bent in the middle between e_1^- and e_2^- but is kept aligned? The answer is that the actions continue to proceed from e_1^- and e_2^- toward p_1 and p_2 respectively. From where are the electron-positron pairs of the vacuum provided? The necessary electron-positron pairs are provided from the space of the vacuum around the e_1^- and e_2^-. One after another, electron-positron pairs of the vacuum come gathering toward the e_1^- and e_2^-, and e_1^- and e_2^- continue to stay at the same location pressed from all around, which keeps the alignment of the structure.

The figure shows the structure of an ortho-hydrogen molecule. Both the axes of the "shared" two electrons side by side point straight below in parallel, and both electrons are rotating in the same direction because they each give action symmetrically to the protons. Hence, no action takes place between the electrons (no chain of electron-positron pairs of the vacuum sliding on one of the electrons can turn back to slide also on the other electron). Because of this, in this structural spiral model there is no centrifugal force in this case that push the two electrons away from each other,

contrary to the common belief that a ball-structured electron and a ball-structured electron both negatively charged should always push each other away. This difference is the key point of this screw-structured model. On the other hand, the proton and the proton are pushed away by a centrifugal force because their axes are aligned.

Centrifugal force produced only by the orbital revolution
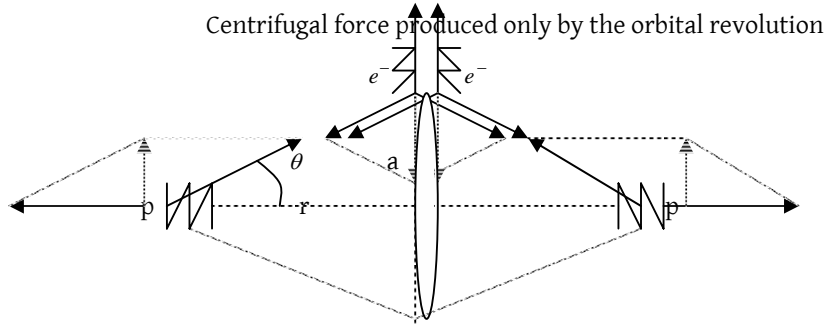
According to the concept of Plank constant,

$$p \cdot 2\pi a = nh \qquad \text{or} \qquad p \cdot a = n\hbar$$

where p is the momentum of the orbital electron, h is Plank constant, and a is the Bohr radius of the circle along which electrons of electron-positron pairs of the vacuum go around when carrying an electromagnetic wave. Here I treat the case where $n = 1$. The centrifugal force coming from the orbital circular motion of the electrons is, as the velocity is p/m:

$$m \cdot \left(\frac{p}{m}\right)^2 \cdot \frac{1}{a} = \frac{p^2}{ma} = \frac{\hbar^2}{m_e a^3}$$

This centrifugal force and the two Coulomb centripetal forces that pull each of the electrons toward the protons are balanced, whence:

$$\frac{1}{4\pi\varepsilon_0} \cdot \frac{e^- e^+}{(\sqrt{r^2 + a^2})^2} \cdot 2\sin\theta = \frac{\hbar^2}{m_e a^3} \qquad \text{(a)}$$

The resultant force of the Coulomb centripetal force addressed to the proton by the two electrons and the centrifugal force addressed to the proton by the other proton should not carry the proton toward the other proton, that is the distance between the two protons should stay constant.

$$\frac{1}{4\pi\varepsilon_0} \cdot \frac{2\,e^- e^+}{(\sqrt{r^2 + a^2})^2} \cdot \cos\theta = \frac{1}{4\pi\varepsilon_0} \cdot \frac{e^+ e^+}{(2r)^2} \qquad \text{(b)}$$

If we divide the equation (a) by (b),

$$\frac{a}{r} = \tan\theta = \frac{\hbar^2}{m_e a^3} \cdot \frac{4\pi\varepsilon_0 (2r)^2}{e^2}$$

$$= 14..36 \cdot 10^{20} \cdot r^2$$

$$r^3 = \frac{5.28 \cdot 10^{-11}}{14.36 \cdot 10^{20}} (meter^3) = 36.769 \cdot 10^{-33} (meter^3)$$

Hence, $\qquad r = 3.325 \cdot 10^{-11} m$

Therefore the distance between the protons in the ortho-hydrogen is:

$$2r = 6.65 \cdot 10^{-11} m$$

An experimental value of the distance is $7.4 \cdot 10^{-11} m$. The two values are near to each other. This difference between the experimental distance and the calculated distance will still be able to be diminished if we surmount by a real curved line of electric force the simplified straight line of electric force of the screw-structured model. A hydrogen molecule is the structure that the conventional quantum physics failed to explain.

Birth of the universe

I can talk about the origin of the universe now. In the beginning of the universe, there was nothing but the vacuum. For some anti-entropy process, two worlds were distinguished: one world got much more electrons, whereas the other got more positrons. The world which got more electrons is the origin of our matter world today. A positron rushed out of the anti-matter world aiming at an electron in the matter world, and on the way, attained the velocity of light. The positron turned "inside out",(because electrical force and gravitational force pull in the opposite direction) and along with it, the clockwise spiral of a positron of electron-positron pairs of the vacuum (which had been already created by the combination of electrons and positrons), clutching the flying positron, turns "inside out" and stretched to form a slackly anti-clockwise outside electrical spiral, whereas the electron of the electron-positron pair also gets turned "inside out" to form a slackly clockwise inside mass spiral, capturing the newly born electron inside. Thus a neutron is formed. Here and there inside the matter world, this formation of neutrons takes place, and decays into protons. A proton could catch an electron to form a hydrogen atom. When the axes of the spiral of a proton and that of a neutron matches, they approach each other and form a pair that constitutes the basic component of other kinds of atoms.

Screw-structured particles show no need for "strong interaction"

There is no special "strong interaction" specific to inside the atoms. In fact, the confusion of modern physics has been even more exaggerated after H. Yukawa's theories explaining the "strong interaction", which is today extended to "quantum chromo-dynamics", talking about "charm", "strangeness", "gluon",etc, which is a real mess.

First, the reason why a meson of smaller size has a higher value of mass contrary to a "common sense" or why a proton has such small mass density, is that, as one can conjecture from Newton's third law of a screw, the gradient of the screw is smaller if the number of windings per unit length of the spiral is bigger. So when the electron-positron pairs of the vacuum acts on the mass spiral, the smaller gradient of course produces bigger gravity. So, for a nucleon, the smaller the size is,

the more mass it has.

Here I still add structural explanation of the so-called "strong interaction", that is, nuclear force that combines a neutron and a proton. I say there is no "strong interaction" in fact. It can be explained all clearly as an electric force if only we find out how a proton and a neutron are structurally combined. As I explained in the last paragraph, a proton has, on its surface, a positron whose axis of electric and mass spiral is aligned with the axis of the mass spiral of the nucleon. On the other hand, a neutron has an electron captured inside its clockwise mass spiral due to the gravity (centripetal between matter and matter) and the outside electrical spiral is only an almost straight string (very slightly anti-clockwise spiral, because it was the string of an electron), and as a consequence, normally is electrically neutral. However, when a proton and a neutron find themselves in the space, due to the secondary (because action/reaction between matter and matter does not take place directly, but can take place only indirectly when mediated and communicated via the reaction chain emitted by reacting anti-matter) gravitational interaction, the spiral axis of the proton and the spiral axis of the neutron are aligned, and through the hole at the end of the inner cylindrical space of the mass spiral of the neutron, the captured electron gets a chance to send an action to the positron on the surface of the proton. The positron on the surface of the proton, of course, sends back a reaction. Thus action/reaction is established between the electron inside the mass spiral of the neutron and the positron on the surface of the proton. The electron inside the mass spiral of the neutron approaches the positron, and almost reaches the end of the inner cylindrical space of the mass spiral of the neutron. As the electron and the positron are located quite close to each other, far closer than the distance between the supposed "center of gravity" of the proton and that of the neutron, contrary to what conventional physicists calculate, based on the supposition that a proton and a neutron have spherical structure having uniform density with probabilistic presence of a positron somewhere inside the sphere of the proton, finding themselves at a loss when faced with the fact that a neutron is electrically neutral, that is, for them, there is no other way than to "invent" false interaction, false forces, false particles, and false anti-particles which do not really exist at all. Conventional physicists say that the "strong interaction", that is, the nuclear force, is 100 times stronger than (only 100 times stronger! And do they really need all those theoretical frail structures?!) electro-magnetic forces. According to them, the strong nuclear force should bind the nucleons within the radius less than $1\,fm$, whereas the Bohr radius of a proton and a neutron based on the notion of "center of gravity", according to them, is $58\,fm$. Never mind! The electron inside the mass spiral of the neutron is at the end of the cylinder, while the positron on the surface of the proton is just touching the end of the mass spiral of the neutron, though the mass structure are stretched in a far larger space. "The radius less than $1\,fm$" is of no wonder at all

(N.B.), because that "radius" is the distance between the electron and the positron of the deeply coupled neutron and proton respectively. Thus, the so-called "strong interaction" does not exist. That is nothing more than an electric force.

(N.B.) **Let us calculate the distance between a proton and a neutron**

From the same equation equating the Coulomb force with the centripetal force that Bohr used in order to deduce "the Bohr radius",

$$\frac{p^2}{m_p\,r} = \frac{1}{4\pi\varepsilon_0}\cdot\frac{e^2}{r^2}\,,\qquad m_p\,v^2\,r = \frac{1}{4\pi\varepsilon_0}\cdot e^2 \quad\text{(where }\ m_p\ \text{ is the mass of a proton)}$$

the orbital velocity of a proton (or a neutron) is:

$$v = \frac{e}{\sqrt{4\pi\varepsilon_0\cdot m_p\,r}}$$

From Newton's third law: $\quad F_1\cdot v_1 = \left|-\frac{1}{4\pi\varepsilon_0}\cdot\frac{e^2}{r^2}\cdot\frac{e}{\sqrt{4\pi\varepsilon_0\cdot m_p\,r}}\right|$

If we integrate both sides of this equation twice in terms of the physical time for one period of micro-oscillation $\hbar/m_p c^2$ of a proton or a neutron, the left hand side should become an integer times the Plank constant:

$$n\hbar = \frac{1}{4\pi\varepsilon_0}\cdot\frac{e^2}{r^2}\cdot\frac{e}{\sqrt{4\pi\varepsilon_0\cdot m_p\,r}}\cdot\frac{\hbar}{m_p\,c^2}\cdot\frac{\hbar}{m_p\,c^2}$$

$$r = \left(\frac{1}{n}\cdot\frac{e^3}{(4\pi\varepsilon_0)^{3/2}}\cdot\frac{\hbar}{m_p^{5/2}\cdot c^4}\right)^{2/5} = \frac{1}{n^{2/5}}\cdot\left(3.998459\cdot10^{-43}\right)^{2/5} = \frac{1}{n^{2/5}}\cdot1.099\cdot10^{-17}[M]$$

This means the "Bohr radius" of a proton and a neutron is about $10\,fm$ when $n=1$, and the radius may de reduced as n increases, and if only $n>317$ the radius may become less than $1\,fm$.

No "quark" exists

With this spiral model, I can explain absolutely without the notion of "quark", "pair of quark-anti-quark", nor with the "bound state" between a quark and an anti-quark why the centripetal force between the neutron and the proton, or better to say, between the captured electron inside the mass spiral of the proton and the electron on the surface of the proton, gets stronger and stronger for some distance as we try to separate the neutron and the proton as if "a rubber cord pulls two objects connected at the two ends stronger at a larger distance, then suddenly gets a little weak as if the rubber cord is torn off in the middle", and if we still try to pull the neutron and the proton away from each other, the centripetal force again increases, which repeats periodically, and then finally when the so-called "strong interaction" surpasses $1\,GeV$,

the force suddenly fades away. The moment when finally the so-called "strong interaction" fades away is the moment when the electron captured inside the mass spiral of the neutron reaches the real dead end of the exit of the spiral cylinder (but cannot get out) and can no longer move toward the positron on the surface of the proton, and when we still pull them away, the electron inside the neutron can no longer emit action to the positron of the proton, and the outer electrical string of no electricity for the neutron is now perceived as the outer straight string, that is, the centripetal electrical force dies out. The reason why centripetal force periodically increases and decreases, as we try to pull the neutron and the proton away for a certain distance, is that the **electron** captured inside the **mass spiral** of the neutron **hooks** at **each roll** of the mass spiral, and **strings** of the **spirals** of nucleons work like "**springs**", thus producing centripetal force of **Hookean elasticity**, as it is dragged toward the final dead end exit. When the electron stops at one roll of the mass spiral, the positron of the proton is as close to the captured electron just like the electron-positron pair "annihilated" into the vacuum, so the centripetal force is almost null. But as we pull the positron of the proton away to some distance, this effect of "annihilated" electron-positron pair fades away, and the real electrical action/reaction of centripetal force takes place between the captured electron and the positron. Because of the very strong electrical force, the hooking to the roll gives way, and the captured electron is carried to the next roll (of the mass spiral of the neutron) at which it hooks now. This hooking and dragging repeats up to the final dead end exit of the mass spiral cylinder of the neutron. Conventional physicists themselves cannot but admit that the so-called "bound state" between a "quark" and an "anti-quark" is just like that of a positronium, that is, the interaction between an electron and a positron. Conventional physicists talk about "confinement of quarks which cannot be taken out separately". What is "confined" is the electron of the neutron (the electron captured inside the neutron cannot be taken out), and the "quark" is nothing more than the interaction itself of the electron and the positron inside the neutron. Thus, the "quark" stops existing when the interaction between the electron and the positron taking place inside the neutron disappears, of course. This explains the detailed characteristics of the so-called "strong interaction" without any notion of quark nor extra-sorts of forces other than Coulomb force.

 Conventional physicists talk about "fragmental fractions" of electrical charge of quarks such as $-e/3$ and $2e/3$, but these can be explained with this spiral model of the deeply connected neutron and proton. This spiral model allows to explain also "mass defect" at the same time. When the electron captured inside the neutron hooked to a roll of the mass and electric spirals at the depth of 1/3 of the total length of the spirals, first approaches the positron attached to the top of the proton, the 1/3 of the outer almost straight electric spiral (so the electric charge was zero) now gets contracted and regains 1/3 of the electrical charge of an electron. On the other hand,

that portion of the mass spiral of the neutron is now "crushed flat" and does not serve as a mass spiral, which causes "mass defect". Please note that the more the portion of the mass spiral is crushed flat, the deeper the connection between the neutron and the proton is. In other words, the more the mass defect is, the more the electrical connection energy is. On the contrary, when the electron of the neutron, once pulled up to and hooked to the roll at the very exit of the inner cylinder of the mass spiral, again goes back deep inside the cylinder combined with the positron of the proton, the outer electrical spiral gets "inside out" and the 2/3 of the portion of the outer straight electrical spiral now contracted becomes a clockwise spiral, thus giving the positive electrical charge $2e/3$.

Generally speaking, the reason why both the volume and the bond energy of an atomic nucleus are proportional to the mass number, which can experimentally be verified, is simply that the electrical charge of the electron captured inside the mass spiral of a neutron plays a role as important as the positron explicitly belonging to a proton.

[Those who want to know the final status of my theories first, are advised to skip to Phase III now.]

About A.E.Akimov's experiment of "communication of infinite velocity"

When two opposite torsional movement is applied to the zero-mass electron/positron pair in the vacuum located exactly on the axis of the torsion, that is, infinite action acting from outside on the exact center, based on the principle of "Newtonian lever", the acted electron/positron pair of zero mass, may longitudinally and across all the universe align the electron-positron pair each rotating in anti-clockwise and in clockwise direction respectively around their own axis, and produce totally counterbalanced stationary time, which enables communication of infinite speed. This takes place in the static ether, not in the dynamic ether (later I explain that there are static ether and dynamic ether). This explains Dr. Akimov's and Dr. Shipov's experiment of communication of infinite speed. The way of alignment of electron-positron pairs is the same for gravitational field and gravitaional radiation (This modeling is different from that of Dr. Akimov's.).

That the vacuum is an ocean of electron-positron pairs, explains the fact that the vacuum has dielectric property, and serves as a medium for electromagnetic wave, that is, light. A light particle or photon should be replaced by an electron-positron pair. Anti-photon too. When light passes by, as the distance between the center of electron and that of positron in the electron-positron pair can be non-zero, "light" may have some non-zero mass (Because of the slight distance, positive and negative mass of electron and positron do not counterbalance).

However light wave itself is absolutely not a particle, but only the wave carried by the acting/reacting electrons and positrons perpendicularly aligned in the vacuum.

"Light knows its destination in advance, before it starts", because the electron-positron pair behaves just as any other particle and the clockwise spiral of the positron communicates the reaction back to the actor before the reactor receives the action.

Radius of electron-positron pairs in the vacuum

The micro-oscillation of a particle results from the particle moving with the solar system at the speed of $\frac{1}{2\pi} \cdot \alpha \cdot c$ against the static ether of the ocean of electron-positron pairs. Along the trajectory, the particle encounters electron-positron pairs one after another. When the particle approaches an electron-positron pair which has no mass, the particle acts on the pair and thus gives the slight anti-clockwise rotational force to the electron-positron pair, which has zero mass, and turns anti-clockwise at an infinite speed. So the physical time advances at an infinite speed. When the particle goes past the electron-positron pair, then the particle sends action to the same electron-positron pair from the back again with the slight anti-clockwise rotational force, which now tries to rotate the pair in the direction opposite to that at the moment of approach. Thus the pair stops and the physical time stops. In this way, we see that each step of the micro-oscillation corresponds to each electron-positron pair that the particle encounters while moving ahead at the above-mentioned speed with the solar system in the static ether. Let's examine the formula of the micro-oscillation of a particle.

$$t' = t - \frac{\hbar}{\pi \cdot m \cdot c^2} \cdot \sin \frac{2\pi \cdot mc^2}{\hbar} \cdot t$$

The reason why a larger mass has a larger frequency of oscillation is that a particle of larger mass acts on a larger number of electron-positron pairs while moving along the trajectory. The value of $\hbar$ may decrease as the linear motion speed of the solar system increases, and so $\frac{2\pi \cdot mc^2}{\hbar}$ increases. Thus, the number of electron-positron pairs that the particle encounters increases, that is, smaller change of time t may produce one rotation in the formula above.

From this description, we can calculate the density of electron-positron pairs hidden in the vacuum ether. We choose an electron as the moving particle. Every second, the solar system advances by the distance:

$$\frac{1}{2\pi} \cdot \alpha \cdot c \quad = \frac{1}{2 \cdot 3.14} \cdot 7.297 \cdot 10^{-3} \cdot 3 \cdot 10^8 = \frac{1}{287} \cdot 10^8 [M]$$

Along the trajectory of the distance in one second, the electron encounters:

$$\frac{2\pi \cdot mc^2}{\hbar} = \frac{2 \cdot 3.14 \cdot 9.11 \cdot 10^{-31} \cdot 3^2 \cdot 10^{16}}{1.05 \cdot 10^{-34}} \cong 500 \cdot 10^{19} = 5.00 \cdot 10^{21}$$

electron-positron pairs. Hence in every one meter in the cosmological space, we encounter $287 \cdot 5.00 \cdot 10^{13} = 1.435 \cdot 10^{15}$ hidden electron-positron pairs of no mass. The diameter of the electron-positron pair should be about $7.0 \cdot 10^{-16}[M]$

The classical radius of an electron is: $2.818 \cdot 10^{-15}[M]$

Time effect by rotation

When an electron advancing the time, that is, producing and accumulating time, and a positron going back the time, that is, consuming the time, find each other at some distance in the space, an action flows from the electron of high density of time toward the positron of low density of time. This signifies that an action is always initiated by a particle and directed toward an anti-particle, that is, an action is first initiated by matter and directed to anti-matter, but not vice-versa.

Now, suppose an object instead of the fixed electron is rotating counter-clockwise in a vacuum in the same position we talked about above. What difference does it bring about to the space? As there are almost equal electrons and positrons inside the object, a magnetic field will be annulled and will not be produced. However, the action chain of electron-positron pairs in the vacuum will rotate at a higher rate. So, if we put an electron in the field between the rotating object and a fixed positron, the electron will be carried faster toward the fixed positron, and if we put a positron in the field, the positron will be carried faster toward one of the electrons in the object.

This means, as Dr. J. G. Klyushin indicates, a rotation of a simple object can produce the same effect as increase or decrease of the electrical charges (or mass) put at a distance from each other, forming an electric field (or gravitational field).

If we put another object somewhere in the field, the effect of the anti-clockwise rotation of the object fixed at the location is an increase of the gravity for the object in the field, and in case of clockwise rotation, a decrease of the gravity (the electrical spiral with far smaller gradient produces far stronger force than the mass spiral, and it is the force produced by the electrical spiral that takes effect), just as Prof. Kozyrev and later Prof. Hayasaka (only for the decrease) state, based on their experiments.

A particle first acts on an anti-particle, but not vice versa

Now I explain this unified concept of gravity and Coulomb force, using the action/reaction process mediated by electron-positron pairs in the vacuum in a chain. Suppose that a static electron (not rotating) and a static positron (not rotating) are fixed at some distance in the

space.

Generally speaking, action takes place, originating from an object of left-hand coordinate system, oriented toward an object of right-hand coordinate system, that is, originating from a particle oriented toward an anti-particle.

An action from an object of left-hand coordinate system against another object of left-hand coordinate system takes place only after a reaction chain is established along which the anti-particle will communicate the acting particle of the existence and the location of the other particle.

In this case, an electron has a left-hand coordinate system, whereas a positron has a right-hand coordinate system. So, the action originating from the electron going toward the positron, is, in concrete, mediated by a anti-clockwise spiral chain (anti-clockwise, because the space-time world of our solar system is made of matter, but not of anti-matter) of electron-positron pairs, thus the chain of the electron-positron pairs are rotating anti-clockwise if seen from the acting side. This vacuum space through which is communicating the chain of electron-positron pairs is the electric and gravitational field at the same time.

If an electron having the anti-clockwise spiral structure is put in the space between the fixed electron and the positron, the anti-clockwise spiral of the electrons rotating anti-clockwise in the chain, transports the isolated electron toward the positron, pushing it away from the fixed electron, whereas if a positron having the clockwise spiral structure is put in the space between the fixed electron and the positron, the clockwise spiral of the positrons rotating anti-clockwise in the chain, transports the isolated positron toward the electron, pushing it away from the fixed positron This explains the Coulomb forces, that is, why electrical charges of the same sign are pushed away by centrifugal forces, and electrical charges of the different signs are pulled to each other by centripetal forces.

I explain still in detail the action/reaction process that carries the free electron away from the fixed electron. More precisely speaking, the reason why the reaction chain of positrons in the electron-positron pairs in the vacuum is created in return for the action chain of electrons in the electron-positron pairs in the vacuum, is that we have put a fixed positron with positive electrical charge on the other end of the chain. Thanks to this reacting chain of positrons communicating back to the fixed electron, a free electron coming onto the action/reaction "field" is recognized by the acting fixed electron (matter) and the fixed electron will have a

chance of emitting another action onto the free electron to push it away.

The action and reaction between two electrons is just as I described above. Action chain does not come direct from the fixed electron to the isolated electron in the field but the isolated electron is acted by the action chain of the electron-positron pairs, established from the fixed electron toward the fixed positron, because the fixed electron of the left-hand coordinate system does not take direct action on the isolated electron of the left-hand coordinate system in the action/reaction field.

In case of an electron outside the nucleus of an atom and a positron on a proton of the atomic nucleus, action is established, and in fact they pull each other. The clockwise rotation of the electron is at a fixed rate, "fixed" according to the velocity of motion of the solar system in the ether, and "clockwise" because of the slight reacting rotation force carried back along the positrons in the action/reaction electron-positron chain.

The so-called "spin" in quantum mechanics is a mixed concept of the (static) spiral structure and the dynamic rotation of the particle or anti-particle. Physicists in the domain of positronium distinguishes para- positronium from ortho-positronium. This distinction corresponds to the rotations in the same direction and in the opposite direction of the spirals of an electron and a positron having their axes in parallel, when approaching each other and combining and then disappearing in the vacuum.

Receiving an action by a particle or by an anti-particle signifies the spiral of the electron-positron pairs of the vacuum fits in and clutches the electric or mass spiral of the particle or of the anti-particle. Sending out an action by a particle or by an anti-particle signifies the electric or mass spiral of the particle or of the anti-particle fits in and clutches the spiral of the electron-positron pairs of the vacuum.

For an electric action/reaction between an electron and a positron, only one anti-clockwise action initiated by the electron is necessary to produce a centripetal force, that is, to carry the positron of clockwise spiral along the reacting clockwise spiral chain of positrons of the vacuum, and to carry the electron itself toward the positron along the anti-clockwise spiral of acting clockwise spiral chain of electrons of the vacuum.

For an electric action/reaction between an electron and an electron (matter and matter), two way actions are necessary to produce a centrifugal force. The action between an electron and an electron is a secondary action produced after the existence of the other electron is communicated to the electron via a reaction chain going from a positron located back somewhere to the electron.

Kozyrev's "an anti-clockwise rotation of an action is reacted with a clockwise rotation of

reaction" does not mean that the action of clockwise rotation emitted from an electron to a positron is returned by a reaction of clockwise rotation of the positron. This is not possible because of the mechanism of the electron-positron pairs of the vacuum. In case of the two-way electrical actions between an electron and an electron and of the two-way mass actions of between matter and matter, actions are communicated to each other and "an anti-clockwise rotation of an action is reacted with a clockwise rotation of reaction" takes place in conformity with Kozyrev's theory.

Why an electron does not act on a neutron (This chapter is later surmounted)

A neutron is neutral with respect to the electrical charge, though it has an electron inside. I explain why. If a neutron is made up of only matter, that is, of an electron and a nucleon both of left-hand coordinate system, according to what I mentioned above, there is no reason why the electron acts on the nucleon or vice versa, and as a consequence, why the electron and the nucleon stay combined. I will later show a three dimensional structure of outside electrical spiral and inside mass spiral of an electron, positron, and nucleon, the last of which captures an electron inside the mass spiral to form a neutron. Let us see here simply that, around the neutron, an anti-particle named "electron neutrino" is floating:

$$n \to p + e^- + \overline{v}_e$$

The electron neutrino is also found to act on proton:

$$\overline{v}_e + p = e^+ + n$$

The electron (matter) of the neutron may find anti-matter, that is, the electron neutrino on which the electron can act. However, they may point out that the electron neutrino has zero electrical charge. I say this does not matter. I explain why. The electron neutrino has very small mass, almost equal to zero. When the electron of the neutron acts on the electron neutrino which has no electrical charge, only the action spiral chain of electron in the vacuum that relates them, gives a slight anti-clockwise rotating force to the electron neutrino, which begins to rotate but does not return clockwise rotation to the positron chain in the vacuum, which is different from the case of a fixed positron returning the reaction. The rotation of only action spiral chain signifies that there is no reacting chain that communicates to the acting fixed electron that a free electron is nearby. Thus, the fixed electron never has a chance of recognizing and acting on the. free electron. This explains why neutron is electrically neutral (here only vs. negative charge, but later I will show the structure that totally makes a neutron electrically neutral), and at the same time explains the so-called "weak interaction". The reason why they observe "spontaneous symmetry breakdown" in the "weak interaction" is that the electron has no partner particle having electrical charge. It is a mistake that Fermi, observing the beta decay, believed that the electron neutrino is not a constituent of a neutron. The

rotation of action spiral chain of electron inside the neutron should certainly change the velocity of time flow and as a consequence change the magnetic field, which is observed as "magnetic abnormality of a neutron.

In the model of the fixed electron and the fixed pairs of the positron put at a distance I described above, I have shown that the action/reaction spiral chain of electron-positron pairs rotates an electron clockwise as the chain transports it toward the positron. On the other hand, a neutron and a proton are strongly pulling each other because of the negative electrical charge of the electron inside the neutron and the positive electrical charge of the positron on the proton.

  A proton and a proton having only positive electricity of a positron, cannot pull each other, though protons have nucleons consisting of matter pulling each other by very slight gravitational force. The role of combining nucleons is played by neutrons, and without neutrons, nucleus of an atom cannot be formed except in case of hydrogen atom of one proton. In all the existing atoms, the number of neutrons is equivalent to or supersedes the number of protons, otherwise nucleons of an atom cannot be combined. The strong centripetal combining force inside an atomic nucleus is nothing more than an extremely amplified electrical force. I will explain later why it is extremely amplified.

Substructure of Electric neutrality of a neutron

  I still further explain the electrical neutrality of a neutron from its substructure.

I have already explained that a particle or an anti-particle is made of a ring of a string structured into an outside spiral and an inside spiral, where the outside spiral plays the role of an electrical charge and the inside spiral plays the role of mass, when acted upon by the anti-clockwise rotating outside spiral chain of electron-positron pairs in the vacuum (the unified electron-positron seems to have smaller radius than an independent electron or positron, and can pass through the inner cylindrical space surrounded by the mass spiral of the independent electron or positron or any other particle or anti-particle except neutrinos which are fragments of the broken string of the spiral). A nucleon is a larger structure than an electron or a positron, and its inside mass spiral has very sparse windings. The mass part of the nucleon is matter and has positive mass. The mass part of an electron also is matter and has positive mass, which means that both have anti-clockwise mass spirals. So in case of a neutron, the mass part of the nucleon and the mass part of the electron pull each other (because they are matter and matter, and both have anti-clockwise spiral of mass), and the electron is pulled into the mass spiral of the nucleon and is captured inside. Moreover, the outside "spiral" of a nucleon is, to tell the truth, the "electronic neutrino" (I use this name to signify the particle

corresponding to the anti-particle "electron neutrino") having a very slight anti-clockwise spiral (because it was originally the string forming an electron now extended into an almost straight string), which therefore has a very slight negative electrical charge (because of a very slight anti-clockwise spiral). Electrically, the electron having anti-clockwise electrical spiral, at the moment when captured inside the mass part of the nucleon is still helped by the centrifugal force from the outside very slight anti-clockwise spiral (of the "electronic neutrino") that pushes away the electron which finally get stabilized at the captured position inside the mass spiral of the nucleon. The captured electron is not visible from outside, and the electrical spiral of neutron is the outer almost straight line of the electronic neutrino. This explains the electrical neutrality of neutron not only against a negative electrical charge but also against a positive electrical charge.

On the contrary, the first constituent of a proton is the essential part of a nucleon of the same kind as that of a neutron, that is, the essential part of a nucleon consisting of a major anti-clockwise sparsely winding mass spiral and the very slightly anti-clockwise winding electrical spiral of an almost straight line (electronic neutrino), and the second constituent of a proton is a positron, having the clockwise rotating outside electrical spiral (positive electrical charge) and the anti-clockwise rotating inside mass spiral (negative mass). Thus, in case of a proton, the centrifugal force tries to push the negative mass of the positron away from the positive mass of the nucleon. Therefore, of course, the positron can never get inside the mass spiral of the nucleon. However, as I have indicated above, the outside electrical string of the nucleon forms an anti-clockwise spiral, though extremely slightly, thus having a negative electrical charge, pulls the positron closer to itself. As an electrical force is far more efficient than a gravitational force, the positron stays on the surface of the essential part of the nucleon thanks to the centripetal force coming from the "electronic neutrino", notwithstanding the very slight gravitational centrifugal force, generated between the positive mass of matter and the negative mass of anti-matter. As the positron stays outside on the surface of the nucleon and as the anti-clockwise electrical spiral of the positron is facing outside, the electrical characteristics of the entire proton is determined by the anti-clockwise outside spiral of the positron.

In any case, the ringed string of the positron of a proton and that of the electron of a neutron are connected to the body of the nucleon just like the link of a chain. In order to take off the electron or the positron, it is necessary to cut the string of the nucleon. In the beta decay of a neutron, this cutting does not take place. And in the following process of a proton, which corresponds to the decay of neutron, to tell the truth:

$$\bar{v}_e + p \ \rightarrow \ e^+ + n$$
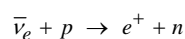
cutting the string of the nucleon does not take place either. The reason why the process:
$$p \rightarrow e^+ + \Pi^0$$
takes extremely long time (or never), is that cutting the string is necessary for the proton to "decay". This may never happen in the natural course of things. Here we recognize that the notion of "life time" of each kind of a particle and an anti-particle in modern physics is not a right notion, that is, an eclectic notion applied to structurally different cases.
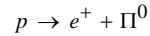
Structural explanation of the decay of a neutron

One of the so-called "weak interaction", beta decay, that is, a transformation of a neutron into a proton takes place as follows. When an independent neutron slides along the rotating action/reaction chain of electron-positron pairs of the vacuum, after some period of time, the action/reaction chain of electron-positron pairs finds out the anti-clockwise electrical spiral inside the neutron and carries that outer electrical spiral of the electron captured in the mass spiral of the nucleon, as I have indicated above, in the direction opposite to the direction of the inner mass spiral of the electron and the inner mass spiral of the nucleon. Thus, the electron captured inside the mass spiral of the nucleon of the neutron, transported to the entrance of the "hole", but in fact, cannot get out easily. The hole is not big enough for the electron to get out. But if the electrical force directing oppositely to the gravitational force is big enough, the entire spiral structure of the electron is turned "inside out", that is, the outside anti-clockwise electrical spiral is turned to a clockwise electrical spiral (positive electrical charge) and the inner clockwise mass spiral is turned to an anti-clockwise mass spiral (negative mass). The former electron is now transformed into a positron on the nucleon. The reason why the positron cannot stay inside the mass spiral of the nucleon is the same as the one I showed for explaining the structure of a proton. Negative mass and positive mass push each other, and the positron gets out of the nucleon but stays on the surface, being pulled by the slightly negative electrical charge of the outside string ("electronic neutrino"). Just at the moment when the electron of the neutron gets transformed into a positron, an electron inside the action/reaction electron-positron pairs of the vacuum engaged with the electron of the neutron is discharged, and seems as if an electron were discharged out of the neutron. But in fact, it is not the electron itself which had been inside the neutron that leaves the scene, but an electron of an electron-positron pair of the vacuum. As the electron-positron pair is broken apart, the former partner positron is cut to a single string but still stays as an anti-particle "electron neutrino". Let us see the two processes again:
$$n \rightarrow p + e^- + \bar{v}_e$$
$$\bar{v}_e + p = e^+ + n$$
The "electron neutrino" is apparently the resultant string of a positron, that is, the string (no
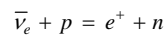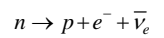
longer forming a ring) formed from the spiral ring string of a positron now cut into a single string. So the name "electron neutrino" is not adequate. It is rather a "positron neutrino". I use the name "electronic neutrino" to signify the single string cut and transformed from an electron instead of a positron. An "electronic neutrino" and "electron neutrino" are two different things: the former is anti-matter, the latter is matter. The second process above shows that the two ends of the single string of the anti-particle "electron neutrino" are connected and mended again to form the positron floating in the space, while the positron on the surface of the proton is now pushed into the hole of the nucleon where it gets "inside-out" and transformed into an electron captured in the neutron.

Mass increase at a high speed is fictitiously caused by frictional drag

Another occasion in which an electron is transformed into a positron takes place when an electron is accelerated by the action/reaction chain of electron-positron pairs of the vacuum, and attains the velocity of light. The outside electrical spiral and the inside mass spiral are pushed in the opposite direction, which turns the spiral structure inside out. The reason why the mass seems to increase as the velocity increases is only the result of "frictional drag", that is, the ridge of the spiral "screw" of the electron-positron pairs of the vacuum rubs the mass spiral of particles. The increase of mass is "fictitious", and does not mean generation or creation of mass or additional particles.

Structural explanation of beta decay

The other kind of the so-called "weak interactions", beta decay is that a proton of the nucleon hit by (as if receiving) an orbital electron, turns into a neutron, producing (as if emitting) an "electron neutrino". This can structurally be explained as follows. As I had explained elsewhere, the spiral axis of an orbital electron is pointing at a proton. The spiral axis of the proton should also be aligned with that of the orbital electron. In other words, due to the electrical centripetal force, the positron on the surface of the proton is located at the nearest position to the orbital electron. At the moment when the orbital electron falls on the proton, the spiral axis of the orbital electron and the spiral axis of the positron and of the proton itself are all aligned. When the orbital electron hits the positron from above due to the centripetal electrical force, the spirals of the orbital electron and of the positron of the proton react like a "spring". Hence, the electron and the positron do not combine, but repel from each other. The positron of the proton gets stuck in the cylindrical space of the mass spiral of the nucleon, whereby the positron turned "inside out", becomes an electron. Thus a neutron is formed. On the other hand, the repelled orbital electron, due to the shock of collision, breaks down into a simple string, that is, an "electronic neutrino" having almost no mass. The point at which the string of

the ring spiral of the electron is cut, should be the joint between the outside electrical spiral and the inside mass spiral.

From structural point of view, if the axis of an electron and that of a positron are aligned at the moment of collision, the process that takes place is, due to the "spring effect" of the spirals:

$$e^- + e^+ \rightarrow \bar{\nu}_e + \nu_e$$
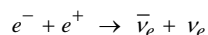
where $\bar{\nu}_e$ and ν_e are neutrinos. In this case, the electron and the positron do not disappear into the vacuum. This is most of the collision cases when an electron and a positron are accelerated in the opposite direction by electrical fields. In order to observe gamma ray, this is not an efficient method of experiment. If the axis of the electron and that of the positron are parallel when they approach each other, the process that takes place is the combination of the electron and the positron that produces an electron-positron pair with no mass, that is, the constituent of the vacuum ether, and emission of gamma ray, because the spiral of electron and that of the positron had been rotating around the parallel axes, naturally emitting an electro-magnetic wave.

I have structurally explained how the so-called "weak interactions" take place. You have seen that they are nothing more than electrical and gravitational forces. Conventional physicists proudly talk about "spontaneous symmetry break down" in "weak interactions". But, this, to say the conclusion first, shows rather their defect. When they confirm "symmetry break down" of beta decay, they are ignoring alpha decay and the gamma rays coming out of uranium. They pay attention only to the electrons, but not to the positron. This is the cause of their failure. Still, they believe that the electrons came out of the neutrons. They never believe that the electrons in the beta decay came out of the vacuum, that is, the electron of the electron-positron pair of the vacuum that takes part in the action/reaction in the sense of Newton's original Third Law. Out of the vacuum, there comes out not only an electron but also a positron observed combined with other particles in the alpha decay. They should know that the gamma ray is the light emitted when an electron and a positron are combined and disappear into the vacuum. They believe "symmetry break down", that is, biased scattering of the electron, takes place only in beta decay, but exactly speaking, in the alpha decay too, "symmetry break down", slightly biased scattering, is also taking place, if only they precisely measure the double helium molecules with positive electric charge, that is, with the attached positrons that came out of the vacuum.

Several kinds of particles
Let us examine the following four processes:

$$p \rightarrow e^+ + \Pi^0 \qquad \text{(a)}$$
$$\Pi^0 \rightarrow 2\gamma \qquad \text{(b)}$$
$$e^- + e^+ \rightarrow 2\gamma \qquad \text{(c)}$$
$$2\gamma \rightarrow e^- + e^+ \qquad \text{(d)}$$

From (a), we can say that the pi-meson Π^0 is the "pure" nucleon, that is, the body of a nucleon common to both a neutron and a proton. As we know already that the outer electric spiral of a nucleon is originally the electron string cut and stretched at full length, from (b), (c), and (d) we can say that the mass spiral of the nucleon which has a slackly clockwise (!) rotation is nothing more than the positron, which has the major electric clockwise spiral (anti-clockwise mass spiral is almost negligible). That is why the mass remainder of the proton Π^0, after the positron leaves it, is almost equivalent to e^- plus. e^+.

This signifies that the electrical part of the string can be used also as mass part of the string. The intensely rotating electrical clockwise spiral of the original positron is extended at full length and the number of windings in a unit of length apparently diminished, but this number of windings is sufficiently dense as a mass spiral. This spiral produces the Mass.

A Fermion is defined as a particle or anti-particle whose winding numbers of the outer and inner spirals are different, like an electron or a positron.

A Boson is defined as a particle or anti-particle whose winding numbers of the outer and inner spirals are the same, in other words, a stretched pair of the electron spiral and the positron spiral combined.

This definition shows why a neutrino, a broken-down string of a particle or anti-particle, can never be a Boson. This definition also shows that such Bosons can be diminished again to turn back to the no-mass electron-positron pairs, which explains the Bose-Einstein condensation, in which practically infinite number of Bosons can occupy the same state.

Mesons are Bosons, because they are originally pairs of the electron spiral and the positron spiral stretched to various degrees. According to the degree of stretch, the electrical charge is always negligible (because so much stretched), but the mass of the type of meson is determined, ranging from the mass of the pi meson to more than forty times larger mass of B mesons.

The fact that outer magnetic flux penetrates a second class superconductor, forming vortex lines show that the vortex line is made of chains of nucleons (formerly formed by stretching electron-positron pairs) of the atoms of the superconductor, regaining again, to a certain degree the stretch out of the diminished state of the electron-positron pairs. Magnetic flux is nothing more than an anti-clockwise rotating electrons in a chain of electron-positron pairs, and is generated and observed more or less when the electrons rotate stably, due to an emitted

action or due to a rotation of an independent electron. Of course the rotation speed of the electrons of electron-positron pairs is higher near the actor and lower at a distance. That is the reason why there appears the rolling in and the twisting of the vortex line, and the fact that a Phase Slip Oscillation, that is, a periodical phase jump, occurs, shows that the clutching of electron-positron pairs in the chain can slip and jump a regular angle to another clutching point. This is my criticism against Ginzburg-Landau theories. They cannot explain what the vortex line consists of, and why the vortex lines appear, though they introduce so much frail structure of mathematical equations. Moreover, it is a mistake for them to introduce Thermal Fluctuation in order to explain phase transition process near T_c. It is not a thermal fluctuation but Actions themselves of the rotating spirals based on Newton's Third Law that guide the phase transition.

Some of the readers might ask: "If the pure nucleon, that is, pi meson consists of outer former electron spiral and of inner former positron spiral, both of which have the same rotational density of spiral, where the directions are anti-clockwise and clockwise respectively, why the gravitational force of the same winding density is much stronger than the electric force of the same winding density?" The reason is that the inner mass spiral for the particles and anti-particles has a small radius, which allows only small number of electron-positron pairs of the chain of the vacuum to pass through (just as you saw the captured electron inside a neutron could not come out easily) and so the clutching between the mass spiral and the spiral of electron-positron pairs of the vacuum does not slip easily, inside, whereas the contact of the spiral chain of electron-positron pairs of the vacuum to the outer electric spiral is assured only thanks to a "pressure" of other chains of electron-positron pairs of the vacuum from outside (Cf. Faraday's "pressure of electric field").

We saw that the vacuum is made up of an ocean of electron-positron pairs. We have seen that the body of nucleons of neutrons and protons are nothing more than the electron-positron pairs stretched at full length.

Maximally possible orbital radius of a planet of the sun

Here I calculate possible orbital radii and the maximal orbital radius of planets of the sun, using Newton's third law, Plank constant, and integrating in terms of the physical time. First, as the orbital centripetal force is equivalent to the gravitational force: $m \cdot \left(\dfrac{p}{m}\right)^2 \cdot \dfrac{1}{r} = G \cdot \dfrac{M m}{r^2}$ where M is the mass of the sun and m the mass of a planet.

Thus, $r v^2 = G M$ and $v = \sqrt{G M / r}$ where v is the orbital velocity of the planet. Newton's third

law in this case is: $F_1 \cdot v_1 = -G \cdot \dfrac{M m}{r^2} \cdot \sqrt{\dfrac{G M}{r}}$. If we integrate twice the both sides of this equation in

terms of the physical time for a period of micro-oscillation of the mass of the nucleon, the left

hand side should be an integer times the Plank constant which is the action radiated by the sun.

$$n\hbar = \int\limits_{0}^{\hbar/m_p c^2} \int\limits_{0}^{\hbar/m_p c^2} (G M)^{3/2} \frac{m}{r^{5/2}} \, dt \, dt = (G M)^{3/2} \frac{m}{r^{5/2}} \cdot \frac{\hbar}{m_p c^2} \cdot \frac{\hbar}{m_p c^2}$$

$$r = \left(\frac{1}{n} \cdot (G M)^{3/2} \cdot \frac{m\hbar}{m_p^2 c^4} \right)^{2/5}$$

This equation shows that the difference of the orbital radius between two neighbor planets

becomes larger as we go away farther from the sun.

If we suppose the planet at the maximal distance from the sun has less than 5 times more mass

than the earth, for the case $n = 1$ corresponding to the minimal action,

$$r = \left(\left(6.672 \cdot 10^{-11} \frac{N\,m^2}{Kg^2} \cdot 2 \cdot 10^{30} \, Kg \right)^{3/2} \cdot \frac{5 \cdot 5.98 \cdot 10^{24} \, Kg \cdot 1.0546 \cdot 10^{-34} \, J\,s}{1.673^2 \cdot 10^{-54} \, Kg^2 \cdot 2.99^4 \cdot 10^{32} \, m^4/s^4} \right)^{2/5} = 5.22 \cdot 10^{12} \, Km$$

Maximally possible observable diameter of the universe

Next I calculate the maximally possible observable diameter of the universe, supposing that the

maximal diameter is the distance a nucleon can send a minimal gravitational action to another

nucleon located at the other end of the universe. I use almost the same equation that Bohr used to

calculate the Bohr radius for an orbital electron, but this time it concerns the gravitational force,

but not the Coulomb force.

$$m_p \cdot \left(\frac{p}{m_p} \right)^2 \cdot \frac{1}{r} = G \cdot \frac{m_p m_p}{r^2}$$

$$r = \frac{(p r)^2}{G m_p^3} = \frac{(n\hbar)^2}{G m_p^3}$$

As it concerns the minimal action, $n = 1$ and:

$$r = \frac{1.0546^2 \cdot 10^{-34 \cdot 2} \, J^2 \, s^2}{6.672 \cdot 10^{-11} \frac{N\,m^2}{Kg^2} \cdot 1.672^3 \cdot 10^{-27 \cdot 3} \, Kg^3} = 3.5662 \cdot 10^{22} \, m$$

This diameter is quite close to the diameter $10^4 \, Mpc = 3.0857 \cdot 10^{22} m$ astrophysicists say to be

observable.

Electron-positron pairs of the vacuum instead of "photon"

The reason why light curves toward gravity as indicated by Einstein can be explained by the fact that the media of light, that is, an electron-positron pair with the electron and the positron slightly shifted from each other, now having non-zero-mass when carrying the light, is acted upon by the gravity according to Newton's action/reaction law. We need no concept of "photon", believed to exist only along the trajectory of light. "Photon" is nothing other than a "shadow" of the pair of electron-positron omnipresent in the vacuum that are slightly shifted from each other (a little dielectric), thus having a slight mass. In the propagation of light, when the positron is slightly shifted away, the mass spiral of the electron gets slightly uncovered, which is recognized as a very small but certain mass by the perfectly combined mediator electron-positron pairs of the vacuum. As the media of light has mass, it "falls down" pulled by the centripetal gravitational force, while the other electron-positron pairs of the vacuum do not fall down because they are perfectly combined (opposite signs of electricity and opposite signs of mass) and have absolutely no mass. We do not need the fantastic mathematical frail structures of Einstein's relativity theories talking about "deformation of space-time", in order to explain why light curves toward gravity.

In fact, the Copenhagen doctrine, the particle wave duality, especially about photon, is funny. The electron-positron pairs perfectly loses mass in the vacuum, offering the possibility of serving as media for the wave of light. However, when they really carry the light, they get slightly shifted and gain slight mass, thus coming out as particles.

The mass of an electron-positron pair when working as a mediator of action/reaction is

$$\frac{h}{c^2}$$

As R. Millikan's experiment about Plank constant showed, $h\nu$ when $\nu = 1$, that is, h is an energy quantum. This energy quantum is carried by the so-called "photon", that is in reality, an electron-positron pair moving at the speed of light. So its momentum is obtained by dividing the energy by the velocity of light: $\frac{h}{c}$ (The momentum of the so-called "photon" equivalent to $\frac{h\nu}{c}$ is used by Compton and Einstein in deriving the equation of Compton wavelength). So the mass of the mediator electron-positron pair in time of action is obtained by dividing the momentum by the velocity of light: $\frac{h}{c^2}$.

Screw model of action/reaction

I here construct a screw-clutching model that models collision of two objects according to Newton's Third Law: $F_1 \cdot v_1 = - F_2 \cdot v_2$ (1)

The first fundamental idea is that if the number of rotation per second is the same and the velocity v of the object is higher, then the winding density of the screw (spiral) becomes sparser, whereas if the number of rotation per second is the same and the velocity of the object is small,

then the winding density of the screw becomes denser. The second fundamental idea is that if only these two screws of the objects clutched each other directly, Newton's Third Law would be assured to be respected, but as these screws directly clutching each other is not observed, it should be the screwing chain of electron-positron pairs that mediates the action/reaction. The third fundamental idea is that the structure of electron-positron pairs will be the same for the static ether and the dynamic ether. The same number of rotations per second of the first idea will be assured by the same mechanism that produces the micro-oscillation of physical time, that is, each rotating chain in the flux of the chains of electron-positron pairs of the static ether gives rotation to each of the particles/anti-particles in the objects, as the objects moves at the constant velocity $\frac{\alpha c}{2\pi}$ attached to the solar system. As the period of the micro-oscillation of the physical time is $\frac{2\pi}{\frac{2\pi m_e c^2}{\hbar}} = \frac{\hbar}{m_e c^2}$ [sec], the screw of the object that moves at the velocity v_1 [m/sec] should have one wind every $\frac{\hbar}{m_e c^2} \cdot v_1$ [m], and the object moving at v_2 [m/sec] should have one wind every $\frac{\hbar}{m_e c^2} \cdot v_2$ [m]. On the other hand, because as the particles/anti-particles of the objects attached to the solar system is moving at the velocity $\frac{\alpha c}{2\pi}$ [m/sec], they get one oscillation every $\frac{\hbar}{m_e c^2}$ [sec], touching the electron-positron pairs of the static ether, the particles/anti-particles should encounter an electron-positron pair of the static ether every $\frac{\alpha c}{2\pi} \cdot \frac{\hbar}{m_e c^2}$ [m]. As we have no reason to assume there is anisotropy of the structure of electron-positron pairs depending on the orientation, $\frac{\alpha c}{2\pi} \cdot \frac{\hbar}{m_e c^2}$ [m] should also be the unit period of the spiral structure of the electron-positron pair of the static ether, and moreover of the dynamic ether. By the way, as the gradient of the spiral of the electron-positron pair should be $45°$ in order to allow perpendicular clutching which is necessary to produce electro-magnetic wave, the radius of the spiral of electron-positron pair should be:

$$\frac{1}{4} \cdot \frac{\alpha c}{2\pi} \cdot \frac{\hbar}{m_e c^2} = \frac{1}{8\pi} \cdot \frac{e^2}{4\pi \varepsilon_0 \hbar c} c \cdot \frac{\hbar}{m_e c^2} = \frac{1}{8\pi} \cdot \frac{1}{4\pi \varepsilon_0} \cdot \frac{e^2}{m_e c^2}$$

$$= \frac{1}{8\pi} \cdot 2.8177 \cdot 10^{-15} \, [\text{m}] = 1.1214 \cdot 10^{-16} \, [\text{m}]$$

$2.8177 \cdot 10^{-15}$ [m] is the classical electron radius.

$$\frac{\alpha c}{2\pi} \cdot \frac{\hbar}{m_e c^2} \, [\text{m}] = \text{period}$$

Electron-positron spiral   diameter

seen from the side
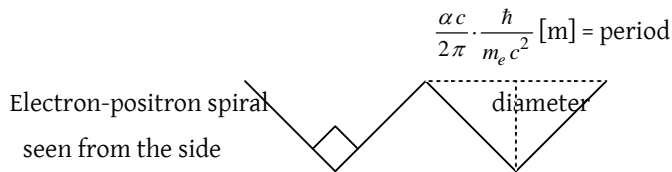
We want to know at what velocity the spiral of electron-positron pairs clutching both the object moving at the velocity v_1 and the object moving at the velocity v_2, and mediating the action/reaction between the two objects, moves ahead. The fourth fundamental idea is that as the spiral of the object moving at the velocity v_1 rotates once, the clutching spiral of

electron-positron pairs also will rotate once, and this rate of rotation will be communicated by the other clutching to the object moving at the velocity v_2, always based on the principle that one rotation brings about one rotation. Thus, the electron-positron pair moves ahead one wavelength $\frac{\alpha c}{2\pi} \cdot \frac{\hbar}{m_e c^2}$ [m] for every one rotation. In this way, the acting object moves at the velocity v_1, the

mediator chain of electron-positron pairs moves at the velocity $\frac{\alpha c}{2\pi}$ [m/sec] (this is the transfer

velocity of the action/reaction proposed by Kozyrev), and produces the force F_2 on the reacting object that moves at v_2, while carrying back the reaction force F_1, all in accordance with Newton's Third Law.

  Please note that this is a screw model of action/reaction carried by the Static Ether. Here too, just like the electric action/reaction in the dynamic ether, one action corresponds to one rotation. One action or one rotation can commonly considered as one cycle of the micro-oscillation of the

physical time. The communication velocity can be considered as $\frac{\alpha c}{2\pi}$ or infinite ∞ or an

arbitrary size, because the same rotating structure and the same mechanism continue to be repeated from the actor up to the reactor. This screw model of action/reaction is applicable to an actor and a reactor of different mass, moving at arbitrary velocities v_1 and v_2, that is, it is applicable also to particles thrown into the scene, being differently accelerated by electrical fields.

Screw model of an electric field

  Here I explain how the screw model works when an electron and a positron act and react on each other via an "electrical field" which is in fact flux of chains of electron-positron pairs acting/reacting themselves and mediating the action/reaction. The fundamental idea is that whatever the distance between the electron and the positron, the action chain of electron-positron pairs of the vacuum rotates exactly one time when it communicates between the electron and the positron. Note that the electron-positron pairs of the vacuum rotates in the same anti-clockwise direction together, which make the spiral advance in the opposite directions: the electron's electrical (anti-clockwise) spiral advances forward and the positron's electrical (clockwise) spiral advances backward at the same velocity. So if the distance is long, the winding of the screw is sparse and the electrical forces relayed to the electron and the positron are weak, whereas if the distance is short, the winding of the screw is dense and the electrical forces relayed to the electron and the positron are strong. This corresponds to the experimental fact that when an electron and a positron are located close to each other, they strongly pull each other, whereas when they are located far from each other, they weakly pull each other. Here I demonstrate that the equation of Coulomb force is exactly assured by this screw model based on Newton's third law.

When the electron-positron pairs clutch the electron and communicate its rotation of action to the positron, the rotational energy of the electron of mass m_e is transmitted to the positron. The rotational energy will be calculated according to the screw model in which the mass and electrical spiral of the electron is wound around a cylinder whose radius is $\frac{1}{2} \cdot \frac{\alpha c}{2\pi} \cdot \frac{\hbar}{m_e c^2}$. I will show on the way that the Coulomb force is inversely proportional to the square of the distance. If the electron and the positron are standing still at first, their moving velocity will be equal, as their structures are symmetrical. So in the equation (1) of Newton's action/reaction law, energy conservation will be respected in this case.

Let r be the distance between the electron and the positron. Let R be the diameter of the spiral of the electron and of the electron-positron pair which is calculated to be equal to $\frac{\alpha c}{2\pi} \cdot \frac{\hbar}{m_e c^2}$ somewhere else in this dissertation, so the wavelength of the spiral is $2R$, because the gradient of the spiral is $45°$. But we have to take into account that the real distance the positron is carried over is along the spiral, so $\pi/2$ times longer than $2R$: so it is $(\pi/2) \cdot 2R = \pi R$. Let F_{e+} be Coulomb force. As it concerns the electrical field here, the communication velocity of the action is the velocity of light c, but not the velocity of the solar system against the static ether.

Between particles located at the distance r, the number of rotation per second is $\frac{1}{\frac{r}{c}} = \frac{c}{r}$ and

the angular velocity is $\frac{2\pi \cdot c}{r}$, because exactly one rotation is sent by one action. The rotational energy of the acting electron clutched by the electron-positron pair is $\frac{1}{2} \cdot m_e \cdot (R\omega)^2$, which should be equal to the work that the Coulomb force F_{e+} carried the positron for the distance πR.

$$F_{e+} \cdot \pi R = \frac{1}{2} \cdot m_e \cdot (R\omega)^2 \qquad \text{(a)}$$

$$F_{e+} = \frac{1}{2\pi} \cdot m_e \cdot R \cdot \omega^2$$

$$= \frac{1}{2\pi} \cdot m_e \cdot \frac{\alpha c}{2\pi} \frac{\hbar}{m_e c^2} \cdot \left(\frac{2\pi c}{r}\right)^2 \qquad \text{(b)}$$

If we take into account the definition of the fine structure constant: $\alpha = \frac{e^2}{4\pi\varepsilon_0 \hbar c}$

$$= \frac{e^2}{4\pi\varepsilon_0 \hbar c} \cdot c \cdot \hbar \cdot \frac{1}{r^2}$$

$$= \frac{e^2}{4\pi\varepsilon_0} \cdot \frac{1}{r^2}$$

This is exactly the definition of Coulomb force.

In this way, in case of electric action/reaction, a force is produced even if the actor and the reactor are not in a linear motion but are standing still, because they are rotating. In electromagnetics, the equation $\vec{F} = Q \cdot (\vec{E} + \vec{v} \times \vec{B})$ is known, that is, the faster the movement, the stronger the force, because the particles are rotated very fast by the electric and magnetic fields. These are not contradictory to Newton's third law, if only we extend Newton's third law in such a way that the velocities v_1 and v_2 signify the velocities of the objects moving against the surrounding electron-positron pairs of the vacuum upon which the objects are acting. In case a mechanical motion such as collision is exerted on the actor and the reactor, the only thing necessary to do is to add up the force coming from the rotation (proportional to linear motion) described in the preceding chapter <Screw model of action/reaction> and the force coming from the electric interaction mentioned above.

Screw model of gravity

The law that one action corresponds to one rotation holds also for gravitational field just as for electrical field. However, a gravitational action is different from an electrical action (in which an electron actively sends out a rotational action into the Dynamic ether) in that a gravitational action is an action in the Static ether and that particles at the two ends of the action/reaction chain passively receive rotational energy from the rotating electron-positron pairs of the static ether. Motion of particles in the static ether is all modeled in the preceding chapter <Screw model of action/reaction>.

Now I explain a screw model of gravity between an electron and a positron standing still in the static ether at a distance r from each other. As they are standing still, according to Newton's third law , energy conservation holds. For the electron-positron pair of the static ether, one action corresponds to one rotation, and the outward communication velocity is $\frac{\alpha c}{2\pi}$ (of course, the communication velocity of gravity can be considered also as infinite ∞ (N.B.), because the same rotating structure and the same mechanism continue to be repeated from the actor up to the reactor). So the angular velocity for the distance r is $\omega = \dfrac{2\pi}{r \Big/ \frac{\alpha c}{2\pi}} = \dfrac{\alpha c}{r}$. The mass of an electron-positron pair of the static ether can be seen as $\frac{h}{c^2}$. The spiral of an electron positron

pair of this mass (instead of the mass of an electron m_e) rotates around the radius $R = \dfrac{\alpha c}{2\pi} \cdot \dfrac{\hbar}{m_e c^2}$.

The objective here is to see what a small gravitational force the rotating electron-positron pair produces and to find out how many times sparser the windings of the Mass spiral of an electron is than its Electrical spiral. If we do not take into account the sparseness of the mass spiral, even the very small mass $\dfrac{h}{c^2}$ is big enough to produce an unrealistically extremely strong "gravitational" force. Instead of (a) of the preceding chapter <Screw model of an electrical field>, the following equation holds for gravity, where $\dfrac{\pi}{2} \cdot 2R \cdot N = \pi R N$ is the wavelength of the mass spiral of an electron (the wavelength of the mass spiral is supposed to be N time longer than that of the electrical spiral):

$$F_{me+} \cdot \pi R N = \frac{1}{2} \cdot \frac{h}{c^2} \cdot (R\omega)^2$$

$$F_{me+} = \frac{1}{N} \cdot \frac{1}{2\pi} \cdot \frac{h}{c^2} \cdot \left(\frac{\alpha c}{2\pi} \cdot \frac{\hbar}{m_e c^2} \right) \cdot \left(\frac{\alpha c}{r} \right)^2$$

$$= \frac{1}{N} \cdot \frac{1}{(2\pi)^2} \cdot \alpha^3 \cdot \frac{h\hbar}{m_e c} \cdot \frac{1}{r^2}$$

$$= \frac{1}{N} \cdot \frac{7.297^3 \cdot 10^{-9}}{2^2 \cdot 3.14^2} \cdot \frac{6.626 \cdot 10^{-34} \cdot 1.055 \cdot 10^{-34}}{9.11 \cdot 10^{-31} \cdot 2.998 \cdot 10^8} [Kg\,m^3\,s^{-2}] \cdot \frac{1}{r^2}$$

$$= \frac{1}{N} \cdot 2.522 \cdot 10^{-54} [Kg\,m^3\,s^{-2}] \cdot \frac{1}{r^2}$$

Using the gravitational constant and mass of an electron and a positron, the gravitational force F_{me+} can also be written as:

$$F_{me+} = G \cdot m_e^2 \cdot \frac{1}{r^2}$$

$$G \cdot m_e^2 = 6.672 \cdot 10^{-11} [N \cdot m^2 \cdot Kg^{-2}] \cdot (9.1095 \cdot 10^{-31} [Kg])^2$$

$$= 5.537 \cdot 10^{-71} [Kg\,m^3\,s^{-2}]$$

Hence $\qquad \dfrac{1}{N} \cdot 2.522 \cdot 10^{-54} [Kg\,m^3\,s^{-2}] = 5.537 \cdot 10^{-71} [Kg\,m^3\,s^{-2}]$

$$N = 4.554 \cdot 10^{16}$$

This means that the wavelength of the mass spiral of an electron is $4.554 \cdot 10^{16}$ times longer than that of the electrical spiral, that is, the windings of the mass spiral is $4.554 \cdot 10^{16}$ times sparser than that of the electrical spiral. As $R = 4.4884 \cdot 10^{-16} [m]$, the wavelength of the mass spiral of an electron is: $2RN = 20.44 [m]$.

A proton has $\dfrac{1.673\cdot10^{-27}[Kg]}{9.11\cdot10^{-31}[Kg]}=1.836\cdot10^3$ times more mass than an electron. Hence, a wavelength

of the mass spiral of a proton should be: $\dfrac{20.44}{1.836\cdot10^3}=1.113\cdot10^{-2}[m]$. As I reasoned elsewhere, the

wavelength of the electrical spiral of a nucleon is identical to the wavelength of the mass spiral (but as an electrical spiral, this winding density produces almost no electricity, while the mass spiral of the same winding density produces such big mass), the electrical spiral of a nucleon, that

is, an electron neutrino, has $\dfrac{2\cdot4.488\cdot10^{-16}[m]}{1.113\cdot10^{-2}[m]}=8.064\cdot10^{-14}$ times less electricity than an electron.

(N.B.) A.E. Akimov and G. I. Shipov wrote in "Torsion Fields and Their Experimental Manifestations": "V. A. Bunin ...demonstrated that the velocity of such waves (gravitational waves) will have the order $10^9\cdot c$."

In case of gravity, the acting object receives the reaction of a slight clockwise rotating force (anti-clockwise if seen from the side of the reactor), contrary to the case of an electrical field in which the acting object tightly clutched to the action-mediator chain of the electron-positron pairs of the vacuum is reacted with a slight anti-clockwise rotating force, or better to say, is pulled closer or pushed away by the reactor when the action-mediator chain reaches and tightly clutches it. This difference of rotational orientation of reaction comes from the fact that the gravity is a spontaneous rotation of the chain of electron-positron pairs of the vacuum which is not tightly clutched to the mass spiral of actor (winding density of the mass spiral is different from the mediating outer electric spiral of the electron-positron pairs, so the spirals cannot tightly clutch each other) when the action is emitted from it nor is tightly clutched to the mass spiral of the reactor, but the anti-clockwise slight rotation of the chain of electron-positron pairs loosely emitted from the actor first acts on the reactor with its own torque (torque of the electron-positron pairs of the vacuum), and then the reactor emits a loose reaction back to the actor with an Opposite torque. As a consequence, the mediator chain of electron-positron pairs in gravitational action/reaction does not rotate but stands still (time stops all along the chain) but transmit the gravitational force to and fro at an infinite velocity. There is no time difference along the chain, because the chain of electron-positron pairs stops rotating in case of gravity. In case of Dr. Akimov's and Dr. Shipov's communication of infinite speed too, the time stops along the two entire parallel chains of electron-positron pairs, which are made to rotate in the opposite directions. In both cases, the time stops. And the difference between the two cases is that gravity uses only one chain electron-positron pairs whereas Dr. Akimov's and Dr. Shipov's experiment uses two parallel chains.

This is what takes place in the static ether. It is static, because the time can become stationary.

Readers of this dissertation might ask why only such a weak force gravity survives for a long distance. The answer is that nucleons (matter) have a clockwise mass spiral just as an electron (matter) has a clockwise mass spiral, so centripetal gravitational forces pull each other. There are also centrifugal gravitational forces between electrons (matter) and positrons (anti-matter), but these are almost negligible if compared with the centripetal forces, because an electron and a positron have extremely small mass. However, the far stronger electrical force cannot survive for a long distance, because there are almost the same number of electrons and protons each having a positron (same quantity of negative and positive electrical charges. The electron of a neutron is hidden inside the neutron and does not get involved in an electrical interaction with outside matter) and a dielectric effect takes place and cancel each other. In case of gravity, some "digravity effect" like a dielectric effect might take place, but the centrifugal forces only between electrons and positrons are negligible and the gravitational forces never cancel each other but accumulate themselves on the contrary.

The reason why the drifting direction of an electron and the drifting direction of a proton in Larmor precession are the same under an electric field and they are opposite under a gravitational field, can be explained, using this screw model of electric action/reaction and of gravitational action/reaction.

Dynamic ether and static ether

Now I talk about a "double structure" of the ether. In fact, the existence of ether was entirely denied by Einstein. The main reason was that A. A. Michelson's experiment in the 18th century showed there is no anisotropy of velocity of light depending on the direction observed on our earth. I say that ether exists, and that ether has a double structure. All I have been talking about show that "ether" consisting of an ocean of electron-positron pairs explains physical interactions and processes in the micro-world. The very simple spiral model explains so many cases of quantum interactions and processes from a unified point of view. I do not deny that there is ether attached to and moving with the sun or the earth or even with every object, dragged by the gravity, because the electron-positron pairs has in fact slight mass, though extremely small, when mediating action/reaction. I reason so, based on the fact that the direction of light is curved by the gravity. This existence of the dynamic ether moving with the earth or the sun explains why there is no anisotropy of velocity of light depending on the direction. When we observe an electric

action emitted by an electron to a positron, the mediator electron-positron chain of the action does not go away and disappear at the speed of the "wind of ether", that is $\frac{\alpha \cdot c}{2\pi}$ where α is the fine structure constant and c is the velocity of light, but accompanies the electron and the positron. Moreover, the Japanese technology IONON, which improves the efficiency of combustion (gas engines of vehicles and boiler) by spiral ceramics wound around the exhaust pipe, leaves effect on the vacuum space inside the pipe even after the spiral is taken off. The vacuum space inside the pipe is moving with the earth. The double structure of the ether shows that A. A. Michelson's experiment based on non-existence of anisotropy of light velocity has not demonstrated the non-existence of ether at all. They firmly believed that it is enough to verify anisotropy to deny the existence of one single ether, but they were never aware that they were carrying out the experiments always only in the dynamic ether that 100% assures isotropy.

There is a static ether, that is, an ocean of electron-positron pairs that stay at the same position in the universe. Thanks to the action of this static ether acting on the electron-positron pairs of the moving ether, the action chain of the electron-positron pairs of the dynamic ether acts like a spontaneously advancing anti-clockwise screw (but not clockwise) in our world, the time and distance can be communicated from the reactor to the actor, and the micro-oscillation of the physical time occurs. In fact, the static ether is observed as the cosmic background radiation discovered by A. A. Penzias and R. W. Wilson in 1965. Contrary to the "big bang theory", the radiation, infrared light, was emitted from the mass spirals of nucleons at the moment atoms were created by positrons dashing into the vacuum, pulled by electrons, and attained the velocity of light. Gamma ray emitted when positrons collided against electrons and created the vacuum disappeared immediately, but the cosmic background radiation of long wavelengths subsisted.

Plank constant and fine structure constant will stay constant all over the universe.

For the fine structure constant, the following equation holds:

$$\alpha c = \frac{e^2}{4\pi\varepsilon_0 \hbar c}\cdot c = \frac{e^2}{4\pi\varepsilon_0 \hbar}$$

$$\hbar = \frac{e^2}{4\pi\varepsilon_0 \cdot \alpha c} = \frac{e^2}{8\pi^2\varepsilon_0 \cdot \left(\frac{\alpha c}{2\pi}\right)}$$

where $\frac{\alpha c}{2\pi}$ can be considered to be the velocity of our solar system against the static ether (Cf. Dr. Lavrenty S. Shikhobalov's "The Initial Principles of N. A. Kozyrev's Causal Mechanisms"; New Ideas in Natural Sciences, Physics, St.-Petersburg, Russia, 1996).

One question may rise in our mind: "If the aforementioned equation is right, then if in the future the velocity of the solar system against the ether changes, will the fine structure constant change or the velocity of light change and the Plank constant change?" After deriving the following hypothetical equations, my tentative hypothesis is that the velocity of light, the electric charge of an electron, and the dielectric constant of the vacuum can change at different locations of the universe, but the unit of action Plank constant and the fine structure constant will not change. The following relation is an attempted approximation of the value of the fine structure constant:

$$\alpha = 7.29735 \cdot 10^{-3} = \frac{1}{137.036}$$

whereas $\quad \dfrac{1}{\sqrt{2} \cdot \pi^4} = \dfrac{1}{1.4142 \cdot 3.1415^4} = \dfrac{1}{137.478}$

If we hypothesize $\quad \dfrac{\alpha}{2\pi} \cong \dfrac{1}{2\sqrt{2}\,\pi^5}$

Radius r

2θ
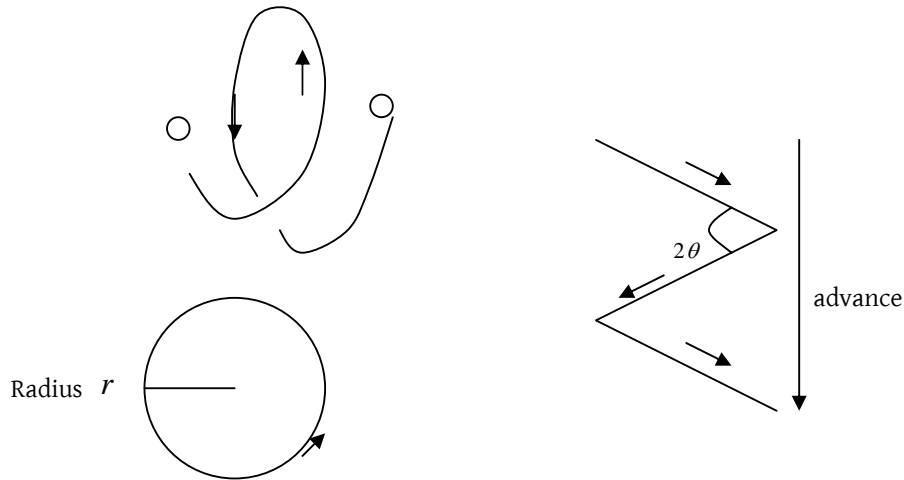
advance

For one rotation of the spiral, the necessary length of the spiral string should be:

$$2\pi r \cdot \frac{1}{\cos\theta} \qquad \text{where} \quad \tan\theta \quad \text{is the gradient of the spiral, and} \quad r \quad \text{the radius}$$

whereas the advancing distance by one rotation is:

$$2 \cdot 2r \cdot \tan\theta$$

So that $2\theta = 90°$, which is necessary to allow the spirals to clutch each other perpendicularly in electro-magnetic wave, the ratio of these should be $\dfrac{\pi}{\sqrt{2}}$:

$$\frac{2\pi r \cdot \dfrac{1}{\cos\theta}}{2\cdot 2r\cdot\tan\theta} = \frac{\pi}{2}\cdot\frac{1}{\sin\theta} = \frac{\pi}{2}\cdot\frac{1}{\sin 45°} = \frac{\pi}{\sqrt{2}}$$

Thus $\quad \dfrac{\alpha}{2\pi}c \cong \dfrac{1}{2\sqrt{2}\,\pi^5}\cdot c = \dfrac{1}{\left(\dfrac{\pi}{\sqrt{2}}\right)^5}\cdot\dfrac{1}{\left(\sqrt{2}\right)^5}\cdot\dfrac{1}{2\sqrt{2}}\cdot c = \dfrac{1}{\left(\dfrac{\pi}{\sqrt{2}}\right)^5}\cdot\dfrac{1}{2^4}\cdot c$

$$\hbar = \frac{e^2}{8\pi^2\,\varepsilon_0\cdot\left(\dfrac{\alpha c}{2\pi}\right)} = \frac{\left(\dfrac{\pi}{\sqrt{2}}e\right)^2}{\dfrac{\varepsilon_0}{\left(\dfrac{\pi}{\sqrt{2}}\right)^2}\left(\dfrac{\pi}{\sqrt{2}}c\right)}$$

As we watch this equation, we can think that the former "fine structure constant", now scattered as $\dfrac{\pi}{\sqrt{2}}$ and its powers, was a real structural numerical constant of the spiral structure of an electron. And as Plank constant is the unit of an Action, Plank constant will also stay constant. Then we cannot but think that, first, as $\dfrac{\alpha c}{2\pi}$ is the velocity of our solar system against the static ether which may change, the velocity of light may change, and then also the dielectric constant of the vacuum and the electric charge of an electron may change at different locations of the universe. As the real detailed trajectory of light is along the spiral of the rotating chain of electron-positron pairs of the vacuum, it is reasonable that the velocity of light is multiplied by the ratio of the spiral length versus the advancing distance. It is also reasonable to multiply the electric charge of an electron by the ratio, because the electric charge measured by the straightforward length of the electric screw of the electron should more in detail be the outer electric spiral length of the electron screw. And it is also reasonable that the dielectric constant of the vacuum is divided by the square of the ratio, because in the equation defining the dielectric constant in terms of magnetic permeability of vacuum: $\varepsilon_0 = \dfrac{1}{\mu_0 c^2}$, the square of light velocity which each should be multiplied by $\dfrac{\pi}{\sqrt{2}}$ (for the same reason as c in $\dfrac{\alpha c}{2\pi}$) is implicitly in the denominator. It is reasonable to suppose that the dielectric constant of the vacuum representing to what extent the electron and positron of the vacuum disengage from each other, depends on the velocity of the dynamic ether made of electron-positron pairs versus the static ether made of electron-positron pairs. So, we can hypothesize that if the velocity $\dfrac{\alpha c}{2\pi}$ of a planet at some location of the universe against the static ether changes, the light velocity and dielectric constant

of the vacuum, change according to $\dfrac{e^2}{\varepsilon_0 c} = 4\pi\hbar\alpha$ and $\mu_0 c e^2 = 4\pi\hbar\alpha$ (where the right-hand side is constant), but the action unit Plank constant and spiral-structural constant "fine structure constant" will stay constant. I suppose that the electric charge of an electron will stay constant, because this is structurally the length of the string of the outer spiral of the particle electron, while the light velocity and dielectric constant of vacuum are dynamically determined parameters, depending on the time velocity.

Screw model of an Electromagnetic Wave

An electromagnetic wave or light can be seen as follows.

The electron of counter-clockwise spiral structure, rotating and flowing along inside a leading wire, works exactly like a clutch perpendicularly linked to the other clutch of the counter-clockwise spiral structure of the electron chain of the electron-positron pair of the vacuum. This clutching works all around the electron in the leading wire, and the chain of electrons in the vacuum forms a rotating and propagating circle or spiraling circle (this is the so-called circular magnetic field formed around an electric current flowing straight along a leading wire. In fact inside the chain of the rotating electrons, there is the magnetic field). And then, again like a clutch, the rotating circle of a chain of counter-clockwise spiral of electrons of electron-positron pairs of the vacuum transfers the rotational movement to the outer circle made of a chain of counter-clockwise spiral of electrons of the vacuum. This clutching repeats to infinity, propagating at the velocity of light.

By vibration of the electric current in the leading wire, the center of the circle is a little shifted, which makes each of electrons forming the circle, work as a clutch again to transfer the rotation to another perpendicular clutch formed of a chain of electrons in the vacuum. All the circles are of the same nature, and are not a magnetic circle and an electrical circle alternatively, as is described in conventional textbooks of electromagnetism. Those circles are at the same time electrical and magnetic.

Fleming's right-hand law and left-hand law are explainable, using the anti-clockwise spiral model of an electron and electron-positron pairs of the vacuum.

Now I show a quatitative relation between "action" and electro-magnetic process, based on the definition of the fine structure constant.

The fine structure constant is defined as:

$$\alpha = \frac{e^2}{4\pi\varepsilon_0 \hbar c} \qquad \text{hence} \qquad \alpha c = \frac{e^2}{4\pi\varepsilon_0 \hbar}$$

Coulomb force is defined as:

$$F = \frac{1}{4\pi\varepsilon_0} \cdot \frac{e^2}{r^2}$$

Hence:

$$\alpha c = \frac{e^2}{4\pi\varepsilon_0\hbar} = \frac{F \cdot r^2}{\hbar}$$

As

$$\frac{1}{r^2} = -\frac{d}{dr}\left(\frac{1}{r}\right)$$

$$r^2 = \frac{-1}{\dfrac{d}{dr}\left(\dfrac{1}{r}\right)} = -\frac{dr}{d\left(\dfrac{1}{r}\right)} = -\frac{\dfrac{dr}{dt}}{\dfrac{d\left(\dfrac{1}{r}\right)}{dt}}$$

Therefore:

$$\alpha c = -\frac{F \cdot \dfrac{dr}{dt}}{\hbar \cdot \dfrac{d\left(\dfrac{1}{r}\right)}{dt}}$$

$$\frac{d\left(\dfrac{\hbar}{r}\right)}{dt} \cdot \alpha c = -F \cdot \frac{dr}{dt} \quad \text{or} \quad \frac{d\left(\dfrac{h}{2\pi r}\right)}{dt} \cdot \alpha c = -F \cdot \frac{dr}{dt}$$

This equation represented as Newton's third law is a very interesting equation representing action/reaction of Coulomb field. $\dfrac{d\left(\dfrac{h}{2\pi r}\right)}{dt}$ signifies the force necessary for one rotation. From Kozyrev's equation (6), that is, $\dfrac{\delta x}{\delta t} = \alpha \cdot c$, we can say here $\dfrac{dr}{dt} = \alpha c$. So, the centripetal or centrifugal Coulomb force F is equal to the force necessary for one rotation $\dfrac{d\left(\dfrac{h}{2\pi r}\right)}{dt}$.

In case an electron gives the Coulomb action and as a consequence a Coulomb force to another electron or a positron located at the distance r, using the rotating chain of electron-positron pairs, the Coulomb force is equivalent to the reacting electron or positron's rotating force that rotates a ring of electron-positron chain of radius r in the vacuum, that is, one rotation of electro-magnetic wave of a radius r.

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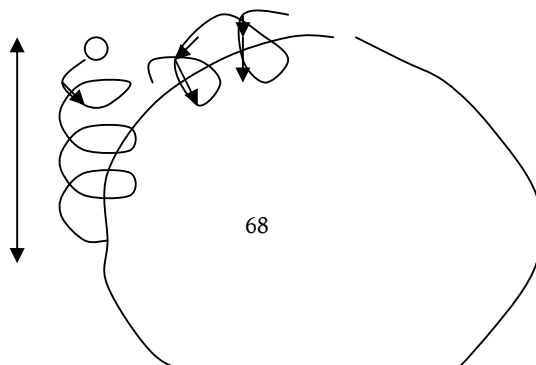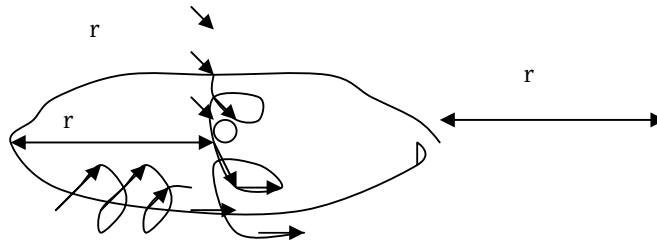
Thus, Plank constant is the unit of action, that is, if an action is less than Plank constant, no force will take effect and no energy will be transferred either. This proves the correctness of Prof. Smirnov's approach to Heisenberg's uncertainty principle, that is, he uses the action, the force, and the energy as the axes of the physical world, in order to explain "quantumness" and "discreteness". Plank constant represented to be equivalent to a product of a change of energy and a change of time is a vector. This redefinition of Plank constant along with improved Heisenberg's uncertainty principle allows to construct a physical system that respects causality.

My approach of micro-oscillation of physical time in order to explain Heisenberg's uncertainty principle is also right, if only Heisenberg's uncertainty principle is modified according to Newton's third law, and made to respect the orientation and causality. The micro-oscillation of physical time comes from rotating chains of electron-positron pairs of the vacuum in the static ether (which is different from the dynamic ether that is moving with the earth).

The micro-oscillation of physical time is necessary in order that particles inside atoms combined with each other by Coulomb force (not by the so-called "strong interaction" of conventional physics), which turned out to be approximately 100 times stronger than it had been expected by Hideki Yukawa and his followers, because of the unexpectedly 10 times closer distance between the positron of a proton and the electron captured inside the mass spiral of a neutron, could collapse, for instance, in case of "tunnel effect". In order to explain the experimentally confirmed destructive effect "tunnel effect", just as to explain all the constructive processes, we do not need probability and statistics at all. Rotating chains of electron-positron pairs of the static ether acting and reacting with the particles are sufficient.

Another tentative explanation of Compton scattering by the screw model

Compton scattering can be explained as action/reaction process in conformity with Newton's third law, in which electron-positron pairs advancing with their own rotation in the vacuum (**as the essential part of the particle/anti-particle of electron/positron is spiral, rotation at the same location produces a real advance at a real velocity, hitting the target at that velocity**) act upon the targeted electron. Thus, the light, electromagnetic wave, represented by particles/anti-particles of electron-positron pairs, acts on the particle electron. I here give

another tentative description of Compton scattering more in detail.

Let us remember that the mass of an electron-positron pair of the vacuum in time of action is $\frac{h}{c^2}$. In the experiment of Compton scattering, the targeted electron could be under the influence of an electrical field emanated by the flowing electrons at the origin of the X-ray. So the axis of the targeted electron is oriented toward the origin of the X-ray. Please remember that an electron screw whose outer electrical spiral and inner mass spiral are wound in a cylindrical form whose axis I am talking about, cannot be acted upon from the side, but can be acted upon when the chain of electron-positron pairs of the vacuum comes in the direction of the axis, the spirals of electron-positron pairs clutching to the spirals of the electron to carry it. So at first, the electron-positron pair moving straight toward the electron has a chance of acting on it. The equation of Newton's third law is as follows:

$$\frac{h}{c^2}a \cdot c = -m_e a \cdot \lambda_0 \qquad \text{where } \frac{h}{c^2} \text{ is the mass of an electron-positron pair in}$$

time of action, a the acceleration which is equivalent for the acting electron-positron and the reacting electron (because the clutching of spirals fits perfectly between the electron and the electron of the vacuum), and λ_0 is the velocity at which the electron is scattered. From this equation, we can derive:

$$\lambda_0 = -\frac{h}{m_e c}$$

As the electron is carried at this velocity, it rotates along the spiral of the electron of the electron-positron pair mediating the light. The rotation, of course, produces radiation of electromagnetic wave of wavelength λ_0 in the direction perpendicular to the axis of the spiral of the electron. This is the Compton wavelength. Please remember that an electromagnetic wave is always radiated in the direction perpendicular to the axis of a rotating electron.

From this point and orientation, under the influence of the electric field from the origin of the X-ray, the electron is then consecutively relayed to the next and next electrons of the electron-positron pairs circulating along the ring of the electromagnetic wave, which causes changes of the direction of the axis of the targeted electron.
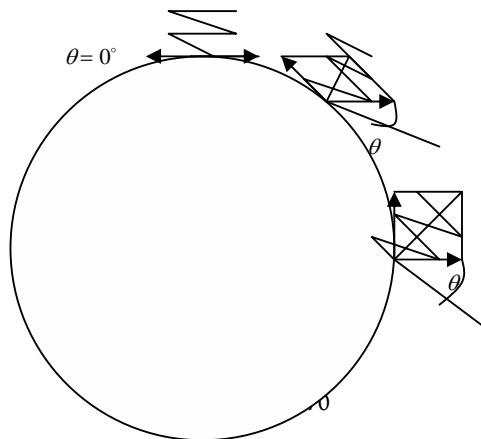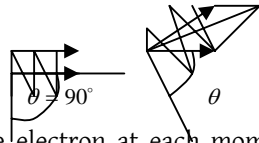
The direction of the axis of the electron at each moment is determined by the direction of resultant force of the two vectors, that is, the electric field emanated from the origin of the X-ray and the electric field of the circulating electromagnetic wave, both of which are, in concrete, rotating chain of electron-positron pairs.
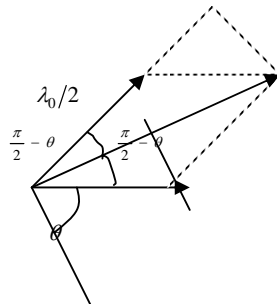
At the moment when the angle between the two vector accelerations is $\pi - 2\theta$, the vector length of the resultant acceleration is

$$2\cos(\frac{\pi}{2} - \theta) = 2 \cdot \sin\theta$$

times the length of the vector acceleration, and so the component of the resultant acceleration in the direction of the electric field of the electro-magnetic wave is

$$2\sin\theta \cdot \cos(\frac{\pi}{2} - \theta) = 2\sin^2\theta = 1 - \cos 2\theta$$

For a constant acceleration, the velocity is proportional to it, because $v = a \cdot t$ where a is the acceleration. So the aforementioned acceleration vectors can also be replaced by the velocity vectors. The velocity of full-sized Compton wavelength was a resultant velocity of two identical

velocity vectors $\vec{\lambda_0}/2$ of the electric field and of the electric field of the electromagnetic wave.

The velocity at which the electron is carried in the general direction of the resultant force of two vectors, that is, the general wavelength of Compton effect is thus:

$$\lambda_0 \frac{1 - \cos 2\theta}{2}$$

The formula presented by Compton and Einstein was: $\lambda_0(1 - \cos\theta)$

Please note that my formula has 2θ instead of θ. This is only another tentative explanation of Compton scattering. I ask myself if this better explains or not the real experimental results. If this explanation of Compton scattering is better or not, depends on whether the Compton wavelength

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does not change so rapidly around $\theta = 90°$ or does, respectively. The difference comes from whether to take into account or not the influence of the electric field emanated from the origin of the X-ray.
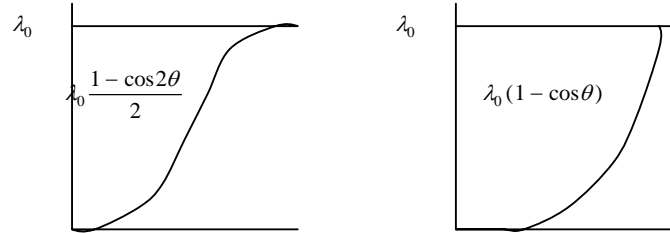
Another Derivation of the equation (2) :Prof.A.P.Smirnv's equation(31)

In my thesis, I derived Prof. A. P. Smirnov's equation (31). Here I give another derivation of the equation (31) which Prof. Smirnov proposed to show the process of a many-body problem.

$$\ln\frac{n}{N-n} - \ln\frac{n_p}{N-n_p} = a_p \left|\frac{D-D_p}{D_p}\right|^{k/2} \qquad (2)$$

Readers are asked to be aware that a similar but a little different equations were derived by Ginzburg and Landau and their followers, but that is specifically invented only for the specific phenomena in superconductivity. What Prof. Smirnov proposes and what I derive below, are a universal law applicable also to the very specific process of superconductivity.

First, let us see the equation (8) again.

$$m(t') = \frac{N\cdot\dfrac{\hbar}{\alpha c}}{x(t')} = \frac{N\cdot\dfrac{\hbar}{\alpha c}}{\alpha c\cdot t'} = \frac{N\cdot\dfrac{\hbar}{\alpha^2 c^2}}{t'} \qquad (8)$$

In order to show clearly the essential part of this derivation, I simplify the equation (8) as follows, ignoring constants, which does not damage the essential part.

$$m(t) = \frac{1}{t}$$

This equation could also be justified directly by the micro-oscillation of physical time. In the micro-oscillation of physical time, the time grain was $\Delta t = \hbar/mc^2$. So:

$m = (\hbar/c^2)\dfrac{1}{\Delta t} = a\cdot\dfrac{1}{\Delta t}$. We have only to take into account it is Δt instead of t .

If we integrate the left and right hand sides of the above equation by time, we get:

$$\int m\, dt = \int \frac{1}{t} dt = \ln t + C = \ln\frac{1}{m} + C = C - \ln m$$

Remember that m in the equation (8) which was derived for analyzing action/reaction processes, signifies "mass information carried at the time distance t or at the distance $x = \alpha c\cdot t$ ". So, let us

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put:

$$m \rightarrow \frac{M_0 - M}{M}$$

$$m \rightarrow \frac{M_0 - M_p}{M_p}$$

$$t \quad \rightarrow \quad T_p = \sqrt{\frac{t_p}{t - t_p}}$$

In the first and second substitutions above, the right hand side means relative mass, and the right hand side of the third substitution means relative time inside matter.

The explanation of this third term is based on my reasoning in the "Phase III" of this dissertation, that is, only this explanation was added to this chapter after I began writing "Phase III". The internal relative time T_s was derived in this dissertation in the chapter "Red Shift and Time Delay" in "Phase III" you will find far below in this dissertation. Here I review the derivation. It concerned the transformation of the red shift under gravitational effect (which represents the fundamental time-delay) into the red shift under Doppler effect (which is a combined result of fundamental time-delay caused by motion and pure Doppler effect), and then transforming it into the square-root distance of Minkowski time-space, thereby taking into account that in linear motion, the gravitational potential of an electron-positron pair is replaced by its kinetic energy, obtained by adding up the mass of the electron and that of the positron, the latter of which in an isolated state had negative mass but now functions as a positive mass, because as a combined pair with the electron, the positron spiral can no longer rotate freely. As the gravitational potential in the original equation supposes unit mass, after all, m is put equal to 1. After the transformation, ω_0 and ω_s are replaced by t_0 and t_s, because ω_0 and ω_s no longer mean explicit angular velocity of the particles but the quotient means the time delay ratio caused by the linear motion:

$$\frac{\omega_0 - \omega_s}{\omega_s} = \frac{1}{c^2}(\Phi_s - \Phi_0) = \frac{1}{c^2}(g\,l_s - g\,l_0) \qquad \text{where } m \text{ is considered } 1$$

$$\frac{t_0 - t_s}{t_s} = \frac{1}{c^2}\left\{ \frac{1}{2}(m+m)c^2 - \frac{1}{2}(m+m)v^2 \right\} \quad \text{where } m \text{ is put equal to } 1$$

$$= \frac{c^2 - v^2}{c^2} = \frac{1}{T_s^2}$$

$$= 1 - \frac{v^2}{c^2}$$

This is why in the chapter "Red shift and time delay", the result of Doppler effect was still multiplied by $T_s = \dfrac{1}{\sqrt{1 - \left(\dfrac{v}{c}\right)^2}}$. Inversely, this also explains why it is not wrong to multiply by the

light velocity c the fourth dimension of Minkowski's 4 dimensional time-space:

$$ds^2 = d\,x^2 + d\,y^2 + d\,z^2 + d\,y_4^2 = d\,x^2 + d\,y^2 + d\,z^2 - c^2\,d\,t^2 \qquad \text{where} \qquad dy_4 = i\,c\,dt \quad . \qquad \text{Otherwise,}$$

Minkowski's fourth term is not a convincing argument.

Here, from: $\qquad T_s = \sqrt{\dfrac{t_s}{t_0 - t_s}}$, replacing t_s by t_p, t_0 by t, and T_s by T_p,

we obtain the above substitution: $\qquad T_p = \sqrt{\dfrac{t_p}{t - t_p}}$

This paragraph up to here was added after writing "Phase III" started.

Let us come back to the question of the equation (31). M signifies mass, M_0 the maximal mass, and M_p the mass of p –th phase. By substituting them, we get:

$$\int \frac{M_0 - M}{M}\,d\,T_p = C + \ln\frac{M}{M_0 - M}$$

$$\int \frac{M_0 - M_p}{M_p}\,d\,T_p = C + \ln\frac{M_p}{M_0 - M_p}$$

Please note that the function logarithm $\ln$ has not come out of Boltzmann's statistics, but came out of the integration of $\frac{1}{t}$ by time. Then, by subtracting the second equation from the first, we get:

$$\ln\frac{M}{M_0 - M} - \ln\frac{M_p}{M_0 - M_p} = \int \left(\frac{M_0 - M}{M} - \frac{M_0 - M_p}{M_p} \right) d\,T_p$$

$$= \int \left(\frac{M_0}{M} - 1 - \frac{M_0}{M_p} - 1 \right) d\,T_p$$

$$= \int \left(\frac{M_0}{M} - \frac{M_0}{M_p} \right) d\,T_p$$

$$= \int \left(M_0 \cdot \left(\frac{1}{M} - \frac{1}{M_p} \right) \right) d\,T_p$$

$$= \frac{M_0}{M_p} \int \left(M_p \cdot \left(\frac{1}{M} - \frac{1}{M_p} \right) \right) d\,T_p$$

$$= \frac{M_0}{M_p} \int \left(\frac{\frac{1}{M} - \frac{1}{M_p}}{\frac{1}{M_p}} \right) d\,T_p$$

As mass is a reciprocal of time except a constant coefficient, and taking into account the definition

of T_p , and putting $\dfrac{M_0}{M_p} = -a_p$:

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$$= -a_p \int \left(\frac{t - t_p}{t_p} \right) d \sqrt{\frac{t_p}{t - t_p}}$$

$$= -a_p \int \frac{1}{T_p^2} \, dT_p$$

$$= \frac{a_p}{T_p}$$

$$= a_p \sqrt{\frac{t - t_p}{t_p}}$$

As the temperature is proportional to time (if reviewed <u>from the point of view</u> $Tem \propto 1/\Delta t$ <u>obtained in</u> **Phase III,** "time" here should be **physical** time **difference** $\Delta t'$ <u>corresponding to</u> **mathematical** time **difference** Δt), we put: $Tem = t$ where Tem is the temperature (N.B.):

$$= a_p \cdot \sqrt{\frac{Tem - Tem_p}{Tem_p}}$$

(N.B.) $\frac{\Delta t'}{\Delta t} = k t'$ (where t' is the physical time and t is the mathematical time), holds as far

as the density of spiral windings in a unit of length is fixed (that is, structure of the spiral is fixed) and as far as clutching of spirals does not slip. This equivalence is assured by the spiral structure and its clutching.

The above mentioned formula $Tem = t'$ could be replaced by $Tem = \frac{\Delta t'}{\Delta t}$. This signifies that the

slower the physical time advances (the faster the math time), temperature goes down. The choice

of t or $\frac{\Delta t'}{\Delta t}$ corresponds to the relation that in the first class phase transition the entropy

change as quotient of temperature $\Delta S = \frac{\Delta Q}{Tem}$ is concerned, whereas in the second class phase

transition the specific heat as quotient of temperature change $C_V = \frac{\Delta Q}{m \cdot \Delta Tem}$ is concerned.

If we put $D = Tem$ and $D_p = Tem_p$ for the temperature which is one of the possible parameters to be substituted, we get:

$$= a_p \cdot \left| \frac{D - D_p}{D_p} \right|^{\frac{1}{2}}$$

Thus, we have derived the experimental equation (2) for the case of temperature. The exponent $\frac{1}{2}$ corresponds to the three dimensional case.

Readers might have noticed that as mass is also a reciprocal of time, D can also be mass M,

that is:
$$= a_p \cdot \left| \frac{M_p - M}{M_p} \right|^{\frac{1}{2}}$$

Taking this into account and as temperature is equivalent to energy (of the vacuum), we can say that in the micro-world where many bodies are interacting each other, $[acceleration] \cdot [space\,dis\tan ce] = Const$. As we have seen that particle spirals are carried by accelerating rotation, which should be proportional to the distance the particle is carried, D can also be the pressure and the magnetic field, etc.

Temperature and mass at a zero and infinite velocity of time

There is a symmetrical relation between mass & time and temperature & time.

$m = \dfrac{1}{t}$ $\qquad t \to 0 \Rightarrow m \to \infty$:just beside mass $\qquad t \to \infty \Rightarrow m \to 0$: vacuum

$Tem = t \quad t \to \infty \Rightarrow tem \to \infty$:infinitely high temp. $\quad t \to 0 \Rightarrow tem \to 0$:very low temp.

By combining the two equations, we get: $m = \dfrac{1}{Tem}$ where $Tem = t = r$. This explains that in a very low temperature, the superconductive substance increases its density, that is, as Tem comes down near zero, the mass increases while the volume r^3 decreases. As the mass spirals are reduced of their sizes, the number of windings per unit length of the spirals increases. Thus even nucleons reduced of their sizes, find their mass increased. As each particle of the substance reduces its size, the particles of molecules pull each other and are aligned straight, which drastically reduces obstacles along the electrical spirals. This brings about an extremely small electric resistance, in other words, the superconductivity. Concerning Gor'kov's and Eliashberg's equations, conventional physicists talk about "Retardation of interaction" caused by the speed of phonon propagation. "Retardation of interaction" is caused by the time delay I mentioned above.

Thermal conductivity of superconductive substances

As $Tem = t = r$, when the temperature goes down to zero, the time slows down and the spatial size of particles is reduced. Because of that, the crooked structures of molecules and atoms are pulled from both ends, and get aligned straight. The almost straightly aligned electric spirals of nucleons assures the infinite electric conductivity. At a normal temperature, thermal conductivity is proportional to the electric conductivity. However, this is not the case for the thermal conductivity at a very low temperature, because mass spirals of nucleons now reduced of its length and hence increased of its number of windings per unit length of the spiral, disturb a free movement of electron-positron pairs of the vacuum. More precisely speaking, thermal conductivity of superconductive substance is even smaller than that of ordinary substance. In

order to explain this, I do not at all need the concept of "electronic specific heat" that physicists of statistical mechanics use for "renormalizing the energy of electrons". They invent an equation in which the specific heat or electronic specific heat is proportional to mass. The emerging energy in the thermal process is not coming from the orbital electrons of atoms just as they say so, but is coming from the electron-positron pairs of the vacuum in an anti-entropy process as the time advancement slows down, so the transmission velocity slows down. I explain, using the classical definition of specific heat and the classical definition of thermal conductivity, and the concept of Newtonian action/reaction process of spiral structured particles with time theories, why the specific heat is more or less proportional to the temperature, but suddenly increases and decreases at a certain point, and then smoothly comes down to zero in proportion to the temperature again, as the temperature goes down to zero. and why the thermal conductivity is smaller in superconductive substances compared with ordinary substances. First, let us review the classical equations:

$$C_V = \frac{\Delta Q}{m \cdot \Delta Tem}$$

where C_V is specific heat, m is mass, ΔQ is the added or subtracted heat quantity, and ΔTem is change of temperature.

And for pseudo-ideal gas

$$\lambda = a C_v v, \qquad v = \frac{\mu}{\sigma}$$

where λ is thermal conductivity, a is a coefficient, C_V is specific heat, and v is kinematic viscosity, μ viscosity, and σ the density. Or a general definition of the thermal conductivity is:

$$q = -\lambda \cdot grad\,(Tem), \quad \frac{\partial \rho_E}{\partial t} = -div\,q$$

where q is heat flux, and ρ_E energy density.

As $Tem = t$, $\frac{\Delta Q}{\Delta Tem} = \frac{\Delta Q}{\Delta t}$ which is a derivative of energy, that is, an action. So, according to Newton's third law, the action is conserved and $\frac{\Delta Q}{\Delta Tem} = [const]$ in general, except at the temperature of the phase transition. On the other hand, as $\frac{1}{m} = t = Tem$, we can conclude that $C_v = [const] \cdot Tem$, that is, the specific heat is proportional to the temperature, except at the temperature of the phase transition, thus, the specific heat of a superconductive substance is smaller than that at a normal temperature. At the temperature of phase transition, even if we add the heat ΔQ, the temperature change ΔTem is zero, the energy being used for reorganization of the structure. So there appears an infinite peak at that temperature. This structural

reorganization of the phase transition takes place near the temperature ε_c of the static ether (= vacuum) with the cosmic background radiation, under the influence of the physical time oscillation between infinite speed and zero speed. With this sudden structural transformation, there remains almost no obstacles along the almost straight electric spiral of nucleons of atoms and molecules.

Now let us look at the thermal conductivity for pseudo-ideal gas:

$$\lambda = a\, C_v\, v$$

The specific heat C_V of a superconductive substance has been shown above to go down to zero near the absolute zero temperature, so it is smaller than that at an ordinary temperature. The kinematic viscosity v becomes also small in a superconductive substance, because the nucleons of the atoms of a superconductive substance are aligned, which reduces the loss of friction energy for the action/reaction chain of electron-positron pairs.

For the general definition of thermal conductivity, I here reason in the framework of 1 dimensional case, which does not damage the generality of the demonstration.

$$\frac{\partial \rho_E}{\partial t} = -\frac{\partial q}{\partial x} \qquad \text{so} \qquad q = -\int \frac{\partial \rho_E}{\partial t} dx$$

$$\lambda = -\frac{q}{\frac{\partial Tem}{\partial x}} = \frac{\int \frac{\partial \rho_E}{\partial t} dx}{\frac{\partial Tem}{\partial x}} = \frac{\int [const1] dTem}{[const2]} = [const3] \cdot Tem$$

Under the condition that no action dissipates from the set of acting and reacting particles, I can here reason that as $\dfrac{\partial \rho_E}{\partial t}$ is a derivative of energy, that is, an action, according to Newton's third

law $\dfrac{\partial \rho_E}{\partial t} = [const1]$, and as $Tem = t = x$, . $\dfrac{\partial Tem}{\partial x} = [const2]$.

Thus we can conclude that the thermal conductivity of a superconductive substance near the absolute zero temperature is smaller than that of an ordinary substance at an ordinary temperature.

We should be aware that the electric flux or current is defined in an equation similar to that of the heat flux.

$$J = \sigma \cdot grad\, E \qquad \text{where } J \text{ is an electric current, } E \text{ an electric field, and } \sigma \text{ the}$$
electric conductivity..

As in the thermal conductivity, I here reason in the framework of 1 dimensional case, which does not damage the generality of the demonstration. In case of thermal conductivity, under the condition that no action dissipates from the set of acting and reacting particles, I reasoned that as

$Tem = t = x$, . $\dfrac{\partial Tem}{\partial x} = [const2]$. In this case of electric conductivity, a similar reasoning is possible. As

an electric field E signifies that on the cathode, there are superfluous electrons, and on the anode, electrons are scarce or positrons (inside the protons) are superfluous. As electrons rotate, they advance the time, and as positrons rotate, they retard the time. So, the derivative of the electric field in terms of 1 dimensional space axis is proportional to the derivative of time in terms of 1 dimensional space axis which is proportional to the time in case of action/reaction:

$$\frac{\partial E}{\partial x} = \frac{\partial t}{\partial x} = [const2]$$

On the other hand, an electric current strongly depends on the topological structure of the route along which the electrons are transported by the electron-positron pairs of the vacuum. First, it is proportional to the two dimensional cross-section area of the route. Second, at a normal or high temperature, it is inversely proportional to the one dimensional bias of those cross-section areas from a straight line, that is, to what extent the route is zigzagging. So the electric current is

proportional to 1 dimensional space axis. $\qquad J = x^2 \cdot \dfrac{1}{x} = x = t = Tem$

Hence, $\qquad \sigma = \dfrac{J}{\dfrac{\partial E}{\partial x}} = \dfrac{Tem}{[const2]}$

The electric conductivity is proportional to the temperature and thus proportional to the thermal conductivity at a normal or high temperature. However, at a very low temperature, as I mentioned earlier, the particles along the zigzagging route is straightly aligned (because the sizes of particles are diminished and are pulled from the two ends), and the electric conductivity approaches infinity.

The electric conductivity is thus strongly dependent on the topological structure of the route, while the thermal conductivity is not. The reason is that the latter is carried by an infrared radiation (a long wavelength) coming out of the mass spirals (so the windings per unit length of the spiral is sparse) of particles. The reason why an electromagnetic wave of a long wavelength can easily be refracted is quite similar to the mechanism of a gyro rotating inside a ship or an airplane that helps to keep the body of the ship or the plane stably upright. The "gyro" of electron-positron pairs, when rotating fast, does not easily yield to a declining (refracting) force against the axis, but when rotating slowly, it easily yields to refraction.

Temperature as the kinetic energy of electron-positron pairs of the vacuum
Now I explain what is heat, and what is temperature.

Heat is not molecular chaos. Temperature is the status of mass spirals of particles, that is, a mass spiral is longitudinally stretched and the windings of the spiral get sparse, as the temperature goes up. Heat is the kinetic energy of the electron-positron pairs of the vacuum, linked to mass spirals of particles and kept inside the space which is occupied by and is accompanying the moving object, and can be transported elsewhere by the motion of the electron-positron pairs. So it is the dynamic ether, not the static ether, that supports the temperature. And the electron-positron pairs of the dynamic ether transfer their kinetic energy to particles, acting on the mass spiral of nucleons. The reason why an infrared radiation that the object radiates, has a low frequency and a long wavelength, is that the frequency of the electromagnetic wave coming out of the mass spiral of nucleons is proportional to the winding density of the mass spiral of nucleons (not from the electric spiral of electrons). In case of gravity too, electron-positron pairs act upon the mass spiral of particles, but in the case of gravity, it is the electron-positron pairs of the static ether, not of the dynamic ether that act. As the wavelength of an infrared radiation is long, the infrared radiation can easily be refracted and may act on the outer electric spiral of a particle too. That is why if there is a difference of temperature between two points in an object, especially a metal, an electric current may flow. As the kinetic energy is transferred from the electron-positron pairs of the vacuum to the particles, matter is transformed from solid phase to liquid phase and finally to gas phase, and at the transition from one phase to another, the kinetic energy of electron-positron pairs is accumulated as potential energy, anisotropy to isotropy in transiting from solid to liquid, and drastically enlarging the distance between molecules in transiting from liquid to gas.

According to the equation $Tem = t$, temperature is relatively higher where the time advances faster. Time is advancing faster where heat is. Retardation of time signifies slower rotation of the chain of electron-positron pairs. As the rotation of the chain of electron-positron pairs is hindered by a friction against spirals of particles/anti-particles, it is possible that time gets relatively more retarded in a higher density substances and if viewed from this retarded time, the motion velocities of particles inside, that is, of reactors, become higher, if action/reaction takes place in it. Time speed is proportional to action transmission velocity and is inversely proportional to the linear motion velocity of particles. The reason why the sun produces much heat is that the sun has high density inside and reduces the speed of electron-positron pairs inside, which retards the time and tries to proportionally lower the temperature of the center which cause a flow of heat toward the center instead of simply dissipating toward outward. And moreover, as the time speed is reduced and thus the velocity of electron-positron pairs is diminished, according to Newton's third law, an anti-entropy process takes place, that is, the energy is extremely accumulated at the electron-positron pairs near the center by amplification of the inward flow of energy. Thus the sun produces still more concentration of energy inside.

$$Tem = t \qquad \text{and} \qquad m = \frac{1}{t}$$

It is interesting to note that in self-hypnotism for promoting one's own health, one tries to convince oneself that the one's arms are getting heavier and heavier, which calms the brain waves and the oscillation slows down (time slows down), and the general temperature of the body comes down. This slowing-down of the time speed brings about a decrease of velocity of electron-positron pairs inside the body, which can now accumulate energy and makes the arms warmer by an anti-entropy process, amplifying energy flow coming from outside. The relation between the "mass", "temperature", and the time is in conformity with the above equations. This should be a self-organizing anti-entropy process.

Information Theories

My definition of "quantity of information" is totally different from that of probabilists & statisticians. Their definition using the "probabilistic information entropy" based on the bias from "ergodicity" and their method of searching in the direction that decreases their information entropy, allows only arbitrary classification and memorization, but does not allow learning. The reason is that probabilists' & statisticians' and Boltzmann's logarithmic formulae different from Prof. Smirnov's formula (2),

$$\ln \frac{n}{N-n} - \ln \frac{n_p}{N-n_p} = a_p \left| \frac{D - D_p}{D_p} \right|^{k/2} \qquad (2)$$

do not allow to solve the many-body problems. The probabilists' & statisticians' failure comes from the fact that the "ergodicity" with the probabilistic independence of parameters is a static model, but not a dynamic model.

[Definition]: **Quantity of Information**: Sum of the absolute value of physical energies that all the Actions have which have participated and are going to participate in dynamically and statically changing the shape of the vacuum where information is..

[Definition]: **Learning**: Extraction of a subjacent function from information data, which is an essential part of anti-entropy processes in the physical world.

[Definition]: **Meta-level Learning**: Extraction of a subjacent function from learned functions and information data (Multiple levels of learning)

From the definition of "quantity of information", we can say that our Universal Science should obtain the capability of figuring out the chain of real processes (causality chain) that caused the change of the shape of the vacuum, making use of all the domains of sciences, such as social & cultural sciences, biological sciences, and physics & mathematics.

[Definition]: **Science**: Should be the result of learning from information data of the proper domain, capable of serving as model laws for figuring out causality chains of real processes.

[Definition]: **Noise in Data**: The fundamental noise comes from the circular rotation at a constant velocity of the chains of electron-positron pairs which are constituents of the static ether of the cosmos. The other kind of "noise" (which in fact is not noise) comes from the non-linearity (= so-called "mathematical chaos") of Newton's Third Law, and from scientists' ignorance of specific structures and dynamics of particles/anti-particles which are in conformity with Newton's Third Law. It is a mistake to believe that noise is something that is generated by many elements (including accidental elements) acting and reacting each other in a complex accidental manner.

As social & cultural sciences, biological sciences, and physics & mathematics should get involved in information theories and learning theories of artificial intelligence, let me evaluate the current status of major so-called "sciences".

I have systematically criticized today's modern physics. The major part of this dissertation is consecrated to the criticism of modern physics. What I have done in physics was to figure out screw structures of particles and functions, applying Newton's laws of action and reaction (which, Newton himself inspired by levels and screws, gave me very useful hints) to physical data in experimental reports in various documents. I learned from data, and I suppose the learned screw model will be able to be used as a learning model in physics, which would serve as a prototype for "scientification" of other domains of today's "sciences", though it is true that we should further study the exact structure and the exact behavior of the screws of electron-positron pairs of the vacuum and other particles/anti-particles.

The key point to the "scientification" of each domain is, as in the definition of science, to figure out the real action/reaction processes.

Criticism of Economics

Economics is a major representative of social sciences. There should be some prototype of Newton's third law even at this level of social sciences. If we consider the value, especially the "circulation value" (exchange value) in economics as something strongly analogous to energy in physics, I find the following problems in today's economics.

The fundamental law of monetary economy, according to Adam Smith who even praised its "invisible hands", is the Law of Demand and Supply. Let us review the equation of action & reaction in Newton's third law:

$$F_1 \cdot v_1 = - F_2 \cdot v_2 \qquad\qquad (1)$$

In the economy, v_1 is the speed or quantity of supply, and v_2 the speed or quantity of demand. If $v_1 > v_2$, that is, the demand is less than the supply, the price F_2 (circulation value or exchange value) first proposed by the supplier will Decrease (!) but will Not increase, contrary to the Newton's third law. Consumers have a tendency not to prefer highly valued products, because "highly valued" signifies a high price (instead of highly useful value) and they are expensive. Moreover when both sides decide to exchange, then:

$$F_1 = -F_2 \qquad \text{(a)}$$

which is the law of exchanging equal value (energy conservation law). If that is not the case, both sides will stop the exchange. So, in case they decide to exchange, after all, the left hand side and the right hand side of the equation (1) become:

$$F_2 \cdot v_1 > -F_2 \cdot v_2 \qquad \text{(b)} \qquad \text{(as } v_1 > v_2 \text{)}$$

and $\qquad\qquad F_1 \cdot v_1 > -F_2 \cdot v_1 \qquad\qquad$ (as the price F_2 decreases)

Hence, $\qquad\qquad F_1 \cdot v_1 \gg -F_2 \cdot v_2 \qquad$ (c)

The above (a) is exactly the misinterpreted Newton's third law, and (b) and (c) show that anti-entropy process can never happen in this monetary economy. This is the reason why exchange of money and goods fundamentally stagnates. Even Keynes could not but admit that the monetary economy is not capable of recovering from depression of itself, so he emphasized the necessity of the government taking initiative for investing on the public works. Whatever he may say and whatever the government may do, the interaction process of monetary economy is:

$$\frac{F_1}{F_2} = -\frac{v_1}{v_2}$$

That is $\qquad\qquad F_2 \cdot v_1 = -F_1 \cdot v_2 \qquad$ (d)

(d) brings about "processes" totally different from those of (2). The economics that adopt (d) are not able to describe action/reaction processes of the economy. And the monetary economy lacking in anti-entropy process, can make actors Compete against each other, but can never let them Learn, because learning, especially learning to produce useful value, is essentially an anti-entropy process. The process based on (a) and (c) will bring about "monotonic increase of entropy", that is, disorder. I have said that the monetary economy can compete ("natural" selection) but cannot learn. This is related to the fact that ten years after publishing the book "The Origin of Species", Charles Darwin himself wrote a book about what will be the consequences if his biological evolutionary theories are applied to the human society. Today's economic theories that are applied for carrying out "restructuring": laying-off, "firing", abolishing less-profitable departments and merging companies, here and there all over the world, are strongly under the influence of the Darwinian random natural selection. By doing so, very often they are randomly destroying a useful value creation and a useful value production, for the sake of "profitability" measured with the circulation value (exchange value).

Today, Banks, fully making use of the Law of Demand and Supply, are trying to maximally increase their efficiency by raising money with "derivatives" and "hedge funds", that is, they are all absorbed in "financial gambling", and are no longer seriously interested in raising industries by lending money to them, because that sober traditional activity of the banks is no longer profitable, and if they continue to make the sober activities, their banks will be defeated and "restructured" in the harsh competition.

Another fundamental problem of monetary economy is that neither the value of each product nor the flow of total values at the moment of exchange (comparable to energy) are vectorial (price has scalar value), whereas the elements in equation (1) of Newton's third law are vectorial. All the evaluations in monetary economy are done as scalar value or price. This impedes the possibility of describing the action/reaction process. In A.I., it is known that learning systems that exchange scalar values (but not vectorial, matrix, or tensorial values) between nodes, can never succeed in learning.

Environmental Problems

Now let us examine the real environmental problem, especially the air pollution and what it brings about to our health. Americans talked about the threat of "endocrine disrupters" in general. It is funny that Japanese misinterpreted it only as a problem of "environmental hormones", that is, the problem of decreasing sperm count only. The Medical Section of University of California announced that because of the air pollution caused mainly by automobile exhaust gas and fumes, the leukocyte count of inhabitants in North America decreased to 3/4 for the last 15 years. This means that for the last 30 years, their leukocyte count would have decreased to $(3/4)^2 = 9/16 \cong 1/2$. Readers would realize what fatal damage this would bring about to our health. It is known that today the major cause of the air pollution is not industrial smoke but exhaust gas and fumes from vehicles. The air of North America is far less polluted than that in Japan. Japan, whose surface area is very small, is the number one country of the highest concentration of cars and motorcycles, though most of Japanese talk with disdain about the problem of industrial smokes in other Asian countries. This means that the decrease of leukocyte count of Japanese would be still more dramatic than that of North American inhabitants. And the hospitals and medical systems of Japan are in such a horrifying situation that the physicians see the patients only as a "big business chance" in order to raise maximal amount of money. Please remember that the air pollution is almost proportional to the development of economy. They say: "the air pollution has recently decreased." That is not true. Only the rate of acceleration of the air pollution has been limited for the last some years. "Environmental tax" is nothing more than a makeshift that can never bring about an essential solution.

In fact, no economic doctrine proposed up to today in history has ever taken the environmental

problem into account. In no economic doctrine, one can tell to what extent their viewpoint is subjective and to what extent objective. This problem comes from the fact that doctrines of today's economics are not based on exact sciences, in other words, they do not analyze the action/reaction processes to show the causality chain. All of today's economists believe that their economic theories will become non-scientific if they talk about anti-entropy, morality, or humanity in the framework of economics. But what is really necessary is to make economy learn anti-entropy, useful value, and humanity.

  Among the three kinds of values: circulation value (=exchange value), cost value and useful value; only useful value which is, by nature, vectorial is the real value. So my utopian proposal is to adopt useful value as evaluation measure of the economy, that is, to put the vectorial useful value directly on the exchange market of an Evolved Bartering Economy, based on still more developed Internet and advanced transportation means (I do not like gasoline engines. Those should be replaced by some engine whose energy is supplied from the vacuum ether.). The velocity v_1 and v_2 in the action/reaction equation (1) in that economy can be considered as the length of time the supplier and the consumer respectively continues to pay attention to the product of the useful value. The consumer may continue to pay attention to the product of the useful value, either because he enjoys the benefit of the product with the useful value, or because he gets interested in and wants to study the technology by which the usefulness of the product is made. In this way, consumers will prefer highly useful valued products. The speed with which a consumer gets rid of a product (which is inversely proportional to the time the consumer pays attention to the product) is v_2 now, thus respecting Newton's third law and realizing anti-entropy process in the exchange process of economy. In this Evolved Bartering Economy, anti-entropy processes will thus be realized. Otherwise, economics will never become science.

Criticism of economic & environmental policies of Japanese government
  On the pretext of defending "the national state industry", i.e., the Japanese automobile industry, the Japanese government has kept on and is keeping on refusing to reduce the total number of automobiles, which has brought about the dramatic increase of the air pollution by 1000 times for the last 30 years. Even with that policy, the Japanese automobile industry keeps on declining.
  Because of that air pollution, Japan is the country of the highest rate of cancer development (the highest in the world), where many people are dying of the polluted air, not a few people cannot live in this country without wearing a gas-mask all the time, and many people who in all their life had never experienced atopic dermatitis, have come to suffer from atopic dermatitis these days.
In declining automobile industry too, we can see the general cause of the declination of Japanese industry. Even up to now, they have been saying that the sections of R & D (Research and

Development) of Japanese companies are never doing real research, but are doing only a very short-sighted "chambermaid's work". After 1990, in the domain high technology of computer software, Japan has dropped out and been left behind (The center of Internet in Asia is now Singapore, it is the Indians that produce the most advanced computer software in Asia today, and Japanese engineers are no longer invited to international standardization committee of computer software). Under the current situation of "re-structuring", Japanese R & D sections of companies are completely being cut off and abolished. That extreme short-sighted policy is still going to be applied soon to Japanese universities and laboratories. I will talk about it in the following chapter. That short-sightedness will further bring about total consecutive declination and decadence of Japanese economy.

The retreat of Japan from high technologies in computer software should have been caused by the systematic degradation of the education of sciences and mathematics. For instance, today there are Japanese young "economists" whose competence in mathematics is barely at the level of junior high school students. Japanese in general are very poor in original or creative ideas. It is the Japanese Ministry of Education that have systematically degraded the education of sciences and mathematics, replacing the number of hours of the education by worshipping ceremonies of "national gods' state" for the last fifteen years or so. The statesmen of Japanese government fanatically believe that preaching the "national gods' state" will reduce the number of cruel crimes committed by young Japanese.

The extreme introversive mentality of Japanese (among Japanese young pupils and students, 80% are extremely introversive, and rarely say a word in a day. Otherwise, they exchange very superficial conversations) have been historically nurtured and cultivated for the last 130 years ever since the Meiji Restoration by the totalitarian state of Japan. This introversive mentality of Japanese, especially of the young, is bringing about today's innumerable extremely cruel man-slaughtering in Japan, which is amplified by the material civilization explicitly or implicitly based on money interest. Without studying the real essential cause of the formation of Japanese cruel society, Japanese government is restoring the worshipping ceremony of "national gods' state" in order to fortify its totalitarianism, which is undoubtedly a state crime.

Re-structuring of universities in Japan

Today, the Japanese government is trying to "reform" and "restructure" the Japanese universities in such a way that they rank "top-most" the private rich universities furnished with a lot of instruments for experiments and facilities that allow only sons and daughters of rich parents to enroll, and strongly demote provincial state universities having poor instruments for experiments and facilities, and abolish and merge provincial state universities, so that, according to them, the reform and the restructuring could raise the "efficiency" of the education and

research of the Japanese universities. This is doubly wrong in that first, it is of no use to talk about "efficiency" before correcting the present entirely mistaken "sciences", and secondly that as Japan has extremely poor scholarship programs, all the brilliant sons and daughters of poor parents especially in the provinces will lose chances of a high-level education and research. In no other countries in the world, universities are evaluated and ranked according to the abundance of equipment and facilities, rather than to the quality of men, that is, quality of researchers and professors. In this respect, Japan is "an economic animal" to the core.

Criticism of Darwinian, Neo-Darwinian Evolutionary Theories

Here I fundamentally and precisely criticize the evolutionary theories of Darwinians, Neo-Darwinians, and of all sorts that, though may be modified, basically follow the two basic Darwinian principles: accidental Natural Selection and accidental Mutation. I mean that evolutions really take place, but the evolutionary theory should not be Darwinian, that is, not random, but has some teleological orientation. I show that according to Darwinian evolutionary theories, if a newly evolved subspecies of longer DNA requiring more energy or of ganglia or neural networks requiring more "information energy" appear, they are destined to decrease in number and disappear.

First, the Third Law of Thermodynamics of conventional physics does not allow increase in number of newly evolved subspecies with the total energy affordable to the species at a limited constant level. The reason is that according to the "ergodicity" of conventional thermodynamics, each individual of the newly evolved subspecies will receive uniformly almost the same amount of energy, at best.

The Darwinian natural selection or struggle for existence in the biological world is more than that, in that it is based on the "law of demand and supply", just as monetary economy is. The only difference between the economic natural selection and biological natural selection is that the former selection means a competition between suppliers, whereas the latter selection means a competition between demanders, because the total supply of energy to the species by the environment does not change so easily. Remember that each individual of the newly evolved species requires more energy than an individual of the preceding non-evolved species in order to survive, because the newly evolved species has longer DNA's or ganglia/neural networks, which consume higher energy. Let us apply the law of supply and demand, in comparison with Newton's third law. Let v_1 be the supply of energy to the newly evolved species. The energy is inevitably limited at a constant level. Let v_2 be the demand of energy by the newly evolved species. As v_2 is larger than that of the preceding non-evolved species and is larger than the supply of energy v_1, according to the law of supply and demand the "price" of energy goes up, that is, the energy becomes more expensive and more difficult to obtain. In the biological world, the newly evolved

species needing more energy for survival must now go with diminished chance of getting energy, and the only possible solution for them is to reduce the number of individuals, which process will repeat until the newly evolved subspecies totally disappears. This means that the Darwinian natural selection prevents emergence of new subspecies of more sophisticated DNA or neural networks. Developing larger neural networks is still more difficult than a simple lengthening of DNA, because the superfluous "information energy" required by it in order to decipher not only the present energy information but also the past and future energy information is a totally superfluous need for energy, not related to the currently supplied physical energy.

Please remember that Darwinian evolutionary theories and the second law of thermodynamic are two sides of a thing. They both are based on probability, randomness, and ergodicity. The only kind of mutation allowed by Darwinian evolutionary theories is the one that allows an emergence of a simpler species with a shorter DNA and minimally possible ganglia, but accidentally shows good adaptation to the environment, thus each individual requiring less and less energy. However, the real evolution brought about highly evolved species one after another, with longer and longer DNA, or with larger and larger neural networks, which individually needs more and more energy. Thus Darwinian evolutionary theories fail to describe the real process of biological evolution. Hence, the evolutionary theories of Darwinians and the likes, are totally wrong.

If we do not break up with Darwin's probabilistic evolutionary theories, biology will never become science, so long as we do not succeed in understanding the action/reaction process between genes on different locations on DNA and that of neurons of neural networks, and in discovering in what process DNA and neural networks were extended and evolved, and in what process DNA was first created.

On the contrary, my evolutionary theories allow an individual of a species, under the constraint of limited energy afforded by the environment, to make DNA of right-hand chirality amplify and use the energy emitted by protein of left-hand chirality, and to make neural networks produce the necessary "information energy" by slowing down or even reversing the time by means of its clockwise double helical structure. Both of these processes are, at the same time, anti-entropy processes and learning processes. In this way, in my model of evolution less constrained by the upper limit of the afforded total energy and its distribution to each individual, learning and an evolution take place inductively and bottom-up, learning from the past and taking the future in advance. As learning of both sorts, that is, physical learning by DNA and intelligence learning by the neural network, is the driving force of evolution, my evolutionary theories are teleological.

I criticize Boltzmann's stochastic process and Darwinian evolutionary theories, because their random natural selection and their random mutation can never create today's biological world we see here on the earth. There was a molecular biologist named Schrum who calculated the

probability of the realization of today's biological world to be absolutely zero. According to him, even if the entire universe were made of thermodynamically (=randomly in the sense of Boltzmann) acting and reacting polypeptides from the very beginning of the universe and even if we waited all the years ever since the creation of the universe up to today, no meaningful DNA, even that of a millipede would ever emerge.

A mother of a mammal often tries to defend her children at the cost of her life, if her children are attacked. I do not think that she does so without sentiment of love for her children. One fundamental difference of the conception of the world between my evolutionary theory and Darwinian evolutionary theory is that my evolutionary theory views "love" as what is Learned and Acquired in the course of evolution, that evolved animals like dogs and cats, for instance, understand human's "love" addressed to them and that in the human society still at a higher level there exits self-sacrifice motivated by "love" for others, which a certain human sentiment deems sublime. Love (this does not mean sex) is the necessary consequence of Learning in the course of evolution. "Love" constitutes one of the most important components of human thought. The self-sacrificing love can never be explained from the "principle of entropy increase" nor from Darwinian natural selection nor from neo-Darwinian Dawkins's "egoist DNA". For Darwinians, it is no use to talk about "love". For them, the only point that matters is which is stronger and which is superior. Darwinian evolutionary theory brings about a cruel conception of the world.

If we artificially simulate the human mind, we see that something like both I.Q. (Intelligence Quotient) and "E.Q. (Emotional Quotient)" are necessary. The latter terminology "E.Q." was invented by an American to signify an emotional capability that makes the person get promoted in a company or succeed in raising much money thanks to his/her good human relation with others. Here I do not mean by the term "E.Q." the capability of getting promoted in a company or of raising much money. "E.Q." here signifies emotional capabilities, the most essential one of which is the love, or warm-heartedness. I do not deny that there are also other negative aspects of emotion, which were produced as a consequence of entropy increase or Darwinian-like natural selection "The stronger prey upon the weaker." However, the positive aspects of essential evolution, that is, the evolution, can never be explained from Darwinian probabilistic viewpoint.

Criticism of today's conventional philosophy of science
Today many people commonly believe that there exists a cruel relation between sciences and the human society. They believe that a scientific research is carried out cool-headed and cold-hearted, all indifferent to what would be the consequence on the human society. This is not the case for the "universal science" we are creating. It is probable that sciences are abused, and we should never stop criticizing such abuses. However, it is also a fundamental mistake to believe that a science by nature is something essentially hostile against humanity. Such a commonly believed

misconception was brought about by the misinterpretation of Newton's Third Law which originally emphasized the importance of anti-entropy processes. The misconception invented the "science" of monotonic increase of entropy, according to which the world by nature never stops crumbling.

Today, all the SF (Science Fiction) novels, mystery stories, action movies or games, more or less based on that cruel philosophy about science (only the "scientifically" strongest, the most excellent, the most cruel one, be it a member of a group of justice or not, will win), are amplifying horrible crimes in our society today, hiding from people's eyes the real social problems that are taking place. This misconception and crimes resulting from it are still more exaggerated by monetary demand-and-supply market economy.

Structure of DNA and Structure of Protein

It is well known that DNA has a clockwise double helical structure, that is, a clockwise chirality, whereas proteins have an anti-clockwise chirality. In conventional sciences, the reasons why DNA has that structure, and why DNA and proteins have opposite chirality are not known. Or better to say, Darwinian evolutionary theorists refuse to answer that question, because they deny the existence of teleology in evolution. But contradictorily, in practical biology, biologists try to explain the functionality of all biological processes, which are going on inside living organs, as teleologically as possible.

From the point of view of my physical world with screw-structured particles acting and reacting according to Newton's third law, where an action is always communicated with a slight anti-clockwise rotation of electron-positron pairs in the vacuum, the reason can be explained as follows.

When an action, be it an electro-magnetic wave or anything, is communicated from a nucleotide to the next nucleotide along a chromosome, the action is communicated with a slight anti-clockwise rotation, whereas the electron-positron pairs mediating the action finds the next nucleotide slightly clockwise oblique. A reaction is communicated from the next nucleotide back to the acting nucleotide, taking longer time than in case the next nucleotide were straight upright instead of being clockwise oblique. In an action/reaction process, it is the reaction that tells the actor what is on the communication route and at what location it is found, measuring the distance with the time. This delay of time in communicating back takes place repeatedly from a nucleotide to the next. This means that time is especially delayed inside a DNA, so the velocities of particles inside are high. On the contrary, inside proteins, having anti-clockwise chirality, the time is relatively advanced, so the velocities of particles inside are small and its virtual temperature is very low. In fact, the velocities of particles inside proteins is extremely so small even in comparison with normal atoms that even a kind of "nuclear reactions" (Cf. Prof. Smirnov's

"INSIGHT: Crisis of Modern Physics" on page 58 - 60), which normally can take place at a very high temperature but is now "cooled" inside proteins, could take place at a normal temperature. This opposition between the structure of DNA and that of proteins is useful for the DNA to carry out Anti-entropy processes, sending out radiation to proteins, accumulating energy (according to Newton's third law) in the proteins, and analyzing the information energy and learning from it.
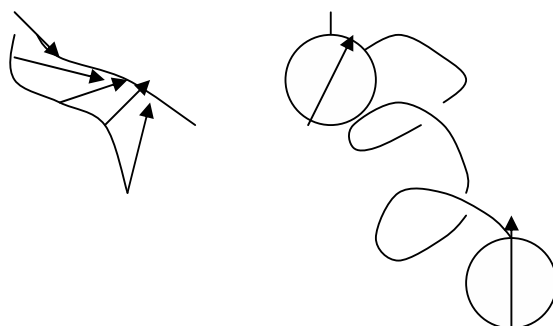
Especially when the chromosome forms a ring structure (or a Moebius band if the number of nucleotide is odd) with the two ends connected, this time delay could be repeated and accumulated without limit, which could bring about very high anti-entropy processes. In case a Moebius band, a non-orientable object, is formed, the electrons and positrons on the right hand side and the left hand side are completely merged, which enables to freely go back and forth in the time axis. In the chapter of economics of this dissertation, I said that the longer the time for which attention is paid, the more the effect of anti-entropy and learning. By controlling the time delay, the time for which attention is paid can become arbitrarily long. Anti-entropy processes carried out by DNA of these structures will bring about useful physical learning in the course of evolution. But sometimes, this same fantastic structure can be made use of for harmful purposes too. For instance, the reason why bacteria having a tolerance to any kind of antibiotics, are formidable creatures, is that they have a ring or Meobius-band structured plasmid DNA.

 The reason why DNA survives through any number of generations while the protein dies at the end of individual life, is that the time advancement speed in DNA is very small or stationary while

the time advancement speed of protein is relatively high.

More in detail, originally, along the chain of DNA if we examine it from the top to the tail, we find that genes whose action/reaction is at a faster tempo are located nearer to the head while the genes whose action/reaction is at a slower tempo are located nearer to the tail. This is reasonable, because as I physically showed it with the spiral action/reaction model of DNA that allows accumulation of time delay by means of the clockwise double helical structure. This general law is true especially for primitive lives. Even for eucaryotes, "telomere" is located at the very tail-end of DNA, which used as a measure of life time of an individual life, acts and reacts so slowly that it terminates its action/reaction and disappears only at the end of the life time of the individual life.

DNA was originally structured in such a way that a slower acting gene is located nearer to the tail, but later in the course of the evolution some of the genes originally located in the middle came to deal with higher energy, which lead the genes to form highly concentrated structure named "heterochromatin" in order to delay the time, that is, to receive concentrated energy by anti-entropy processes. The highly concentrated structure delays time, because it causes friction to the electron-positron pairs of the vacuum, mediator of action/reaction.

In Japan, controversies are going on about the experimental result presented by Dr. Kaoru Kawada, in the framework of Pioneer Project of Japanese Ministry of Science & Technology. In Japan, Dr. Kaoru Kawada, former researcher in Earthquake Laboratory of Tokyo University reported in 1996 that the weight of a rat decreases at the moment of its death. In the experiment, he shut the rat completely airtight in a container so that even a molecule cannot escape. He weighed the rat and recorded the weight changing in the course of time. And in fact, the record clearly showed a decrease of weight at the moment of death. The reason according to my point of view is firstly that because of the left-hand chirality of proteins, the time inside the proteins advances very fast, so the velocity of their particles are very small, and as proteins are passively acted upon by DNA, the reactor's velocity v_2 is very small and according to Newton's third law, the force F_2, including gravity, acting on them becomes stronger while the protein is in life, and secondly that the time inside DNA of clockwise helical structure and inside the neural network of recurrently clockwise helical structure, both of which are actors acting on proteins, is delayed and arbitrarily delayed, so according to $m = \frac{1}{t}$, the mass of all the DNA's and neural network is increased while in life. But when it dies, the action the proteins receive and the time delay of DNA and neural network are canceled and the gravitational force comes down to the same level as that of the outside world.

Criticism of today's medical science and gene technology

A science or an exact science should be a methodology that studies chaining of the cause-consequence relations. Today's medical "science" is incapable of curing illnesses caused by

problem of genes, such as cancer, leukemia, and AIDS. Today's medical "science" declares "brain death" in order to carry out an internal organ transplant. However, in many cases and for the most part, though brains are declared "dead", most of the brain cells (unless they are violently destroyed in traffic accidents, for instance) are ALIVE (doing metabolism) so long as blood is flowing into the brains, in other words, the brain cells simply stopped sending out electrical pulses as typical neurons. Not much effort is made in today's medical (neuroscience) research to recover the functioning of brain neurons of "a vegetable human", though "vegetable humans" are quite often created by frequent failure in anesthesia. That lack of research effort for recovering electric pulsation seems to benefit the projects of internal organ transplants. But please remember that they condemn living brain cells to be "dead". Now when the internal organ is transplanted, the immune system of the patient's body inevitably counter-attacks the transplanted organ, of course, because of the difference of protein structure. Today's medical "science" has no other means than to holdback and oppress the activity of the immune system in that case by some medicine, and as a consequence, mold soon propagates all over the body (just like AIDS), which causes the patient to die a miserable death in some years at the latest. Today's medical science, especially physicians of the immune system, should know beforehand that those consequences will come about, but the hospitals announce it is a fruitful result if only the patient survived some years. In several cases, if the organ had not been transplanted, the patient would have survived for some years or even ten years or so. Notwithstanding, operations of organ transplant are carried out in order to make the operating physician famous and for the hospital or the physician to raise a huge amount of money (of the order between $100,000 and $1,000,000) from the patient or the patient's family (money is not paid at all to the family of the deceased, whose brains were unreasonably condemned to be "dead" and whose organs were taken out alive). This cruel behavior of today's medical "science" should be criticized. Physicians and hospitals are abusing the "rule" that prohibits buying and selling of human organs.

How about the gene technology? Today's gene technology neglects studying how what gene acts and reacts against what other gene and what functionality the introns (pseudo-genes that are not apparently involved in producing proteins) are carrying out, and what role the whole structure of DNA is playing. In spite of that total ignorance of relations between genes, today's gene technology all freely cuts an individual gene out of a DNA and attempts to transplant it into another DNA at some location, which "creates" a life which has no equivalence in the nature. No one knows (even they themselves don't know) what would be the consequence. This is all the more dangerous, because they have not at all succeeded in establishing gene theories of Evolution, that is, cause and consequence chaining of DNA evolution. In spite of all that total ignorance, foods produced by gene recombinations are already being sold on the market, without sufficient

explanation of possible danger. Foods produced by gene recombination is all the more dangerous, because when they recombine genes, they use retrovirus or bacteriophage, proteins produced by which are introduced into each cell of the foods. Today's gene technology is one of the most extreme cases of technology whose research direction is distorted for maximal moneymaking.

Thus neither today's medical science nor gene technology is in the direction of being transformed into exact sciences, if we do not criticize them.

Newton's Third Law that enables Anti-Entropy Processes

Let us study further the equation (1) that mathematically represents Newton's Third Law.

$$F_1 \cdot v_1 = - F_2 \cdot v_2 \qquad\qquad (1)$$

$$F_1 \cdot \frac{\Delta x_1}{\Delta t_1} = - F_2 \cdot \frac{\Delta x_2}{\Delta t_2}$$

As energy can be written as: $F \cdot \Delta x = \Delta E$,

$$\frac{\Delta E_1}{\Delta t_1} = - \frac{\Delta E_2}{\Delta t_2}$$

We can think about the ratio of energy

$$\frac{\Delta E_1}{\Delta E_2} = - \frac{\Delta t_1}{\Delta t_2}$$

This can be rewritten as: $\quad \Delta E_1 \cdot \Delta t_2 = - \Delta E_2 \cdot \Delta t_1 \qquad\qquad (a)$

On the other hand, from the equation (6) $\dfrac{\delta x}{\delta t'} = \alpha \cdot c$ where $\delta t'$ is a change of physical time, we

can deduce: $\quad \dfrac{\delta t}{\delta t'} \cdot \dfrac{\delta x}{\delta t} = \alpha \cdot c$, whence $\quad v = \dfrac{dx}{dt} = \alpha \cdot c \cdot \dfrac{dt'}{dt} \qquad (b)$

This signifies that the transmission velocity of action is proportional to the velocity of physical time.

This can also be verified with Newton's third law itself.

$$m_1 \cdot (v_1' - v_1) \cdot \frac{v_1}{\Delta t_1} = - m_2 \cdot (v_2' - v_2) \cdot \frac{v_2}{\Delta t_2}$$

The law of momentum conservation is: $m_1 \cdot v_1 + m_2 \cdot v_2 = m_1 \cdot v_1' + m_2 \cdot v_2'$, which can be transformed into: $\quad m_1 \cdot (v_1' - v_1) = - m_2 \cdot (v_2' - v_2)$.

Hence, $\qquad\qquad \dfrac{v_1}{\Delta t_1} = \dfrac{v_2}{\Delta t_2}$

In case m_1 and m_2 are two interacting particles (not in case one of the particles is the electron-positron pair of the vacuum), the period of time for which the two particles are in contact, that is, in interaction, should be the same if measured with the mathematical time. If we suppose v_2 is smaller than v_1, as the same mathematical period of time is measured as a smaller

period of time Δt_2, the time velocity inside m_2 should be higher, whereas for v_1, the same mathematical period of time is measured as a longer period of time Δt_1, which means the time velocity inside m_2 should be smaller. Therefore, the velocity of physical time is Inversely Proportional to the linear motion velocity of a particle.

In case one of the particles, for instance, m_1 is an electron-positron pair of the vacuum, v_1 and v_2 are the transmission velocity (not a linear motion velocity of the particle), and Δt_1 is a mathematical (not physical) period of time. Therefore, the velocity of physical time Δt_2 is Proportional to the transmission velocity v_2 inside m_2.

If only we admit that as the physical time delays, the velocity of action transmission slows down or vice versa, we see that the equation (8) or its abbreviated form $m = \dfrac{1}{t}$ is equivalent to the equation (1) of Newton's Third Law. Both (1) and (8) show inverse proportionality between mass or gravity and the action transmission velocity or the physical time velocity. In other words, $m = \dfrac{1}{t}$ is another expression of Newton's third law.

The same is true for the proportionality between the temperature or the energy concentration in a space interval and the physical time speed. In other words, the temperature is proportional to time velocity:

$$Tem = t \qquad \text{(where } t \text{ is the physical time)}$$

is equivalent to
$$\frac{\Delta E_1}{\Delta x_1} \cdot \frac{d t_1'}{d t} = -\frac{\Delta E_2}{\Delta x_2} \cdot \frac{d t}{d t}, \quad \frac{\Delta E_1}{\Delta x_1} \cdot d t_1' = -\frac{\Delta E_2}{\Delta x_2} \cdot d t \qquad (c)$$

where (c) is obtained by transforming the equation (1) of Newton's Third Law. Here, temperature is sensed by electron-positron pairs, whose energy and the time velocity are represented by the right hand side of (c). $\dfrac{\Delta E_2}{\Delta x} = F_2 \propto Tem$ is proportional to $d t_1' \propto t$.

In case v_2 and v_1 are transmission velocity of action and reaction respectively, (1) can be rewritten as:
$$\frac{\Delta E_1}{\Delta x_1} \cdot \frac{d t_1'}{d t} = -\frac{\Delta E_2}{\Delta x_2} \cdot \frac{d t_2'}{d t}$$

$$F_1 \cdot \alpha c \cdot \frac{d t_1'}{d t} = -F_2 \cdot \alpha c \cdot \frac{d t_2'}{d t}$$

whence:
$$F_1 \cdot \frac{d t_1'}{d t} = -F_2 \cdot \frac{d t_2'}{d t} \quad (d) \quad \text{and} \quad F_1 \cdot \Delta t_1' = -F_2 \cdot \Delta t_2' \quad (d')$$

Thus the action/reaction force is inversely proportional to the velocity of physical time.

On the other hand, what is meaningful in anti-entropy process is the discontinuous energy concentration per unit of distance in the direction of transmission. The energy concentration per unit of distance in the direction of transmission is:

$$\frac{\Delta E}{\Delta x} = \frac{F \cdot \Delta x}{\Delta x} = F$$

Therefore, the energy concentration per unit of distance in each of the interacting substances is inversely proportional to the velocity of physical time in each of the interacting substances, just as (1) signifies that it is inversely proportional to the velocity of action/reaction transmission. Thus (d) is transformed into (c):

$$\frac{\Delta E_1}{\Delta x_1} \cdot \frac{d\, t_1'}{d\, t} = -\frac{\Delta E_2}{\Delta x_2} \cdot \frac{d\, t_2'}{d\, t}$$

Let us compare $\dfrac{\Delta E_1}{v_1}$ and $\dfrac{\Delta E_2}{v_2}$, because they each are energy concentration per unit of distance multiplied by a change of time.

$$\frac{\Delta E_1}{v_1} = \frac{\Delta E_1}{\dfrac{\Delta x_1}{\Delta t_1}} = \frac{\Delta E_1}{\Delta x_1} \cdot \Delta t_1 = F_1 \cdot \Delta t_1$$

$$\frac{\Delta E_2}{v_2} = \frac{\Delta E_2}{\dfrac{\Delta x_2}{\Delta t_2}} = \frac{\Delta E_2}{\Delta x_2} \cdot \Delta t_2 = F_2 \cdot \Delta t_2$$

From the equation (d') above, these two are equivalent.

$$\frac{\Delta E_1}{v_1} = -\frac{\Delta E_2}{v_2}$$

By introducing the relation (c) into this, we can derive:

$$\frac{\Delta E_1}{\dfrac{d\, t_1'}{d\, t}} = -\frac{\Delta E_2}{\dfrac{d\, t_2'}{d\, t}} \qquad \text{so} \qquad \frac{\Delta E_1}{\Delta t_1'} = -\frac{\Delta E_2}{\Delta t_2'}$$

Hence again just like (a) we get: $\quad \Delta E_1 \cdot \Delta t_2' = -\Delta E_2 \cdot \Delta t_1' \qquad\qquad$ (a')

This (a') and (a), another representation of the equation (1) of Newton's third law, are in fact a "improved" Heisenberg's uncertainty principle if only we apply it to the case of a minimal quantum. It is "improved" in that the equations (a) or (a') respects the direction of causality.

In today's nano-technology, they say that at the normal temperature the velocities of linear motions of particles inside an atom is of the order of the velocity of the sound $340\, m/\sec$ and the wavelength of the matter wave is of the order of $\frac{1}{10,000,000} mm = 10^{-10} m$, and if we lower the

temperature to near absolute zero, the velocity of linear motions of particles is of the order of

$1\,cm/\sec = 10^{-2}\,m/\sec$ and the wavelength of the matter wave is of the order of $\frac{1}{1,000}mm = 10^{-6}\,m$,

whereas the velocity of light is $3.0 \cdot 10^{8}\,m/\sec$ and the order of the minimal wavelength is about

$\frac{1}{1,000}mm = 10^{-6}\,m$. As $[wavelength] = [velocity] \div [frequency]$, the inverse of the frequency, that is, the

time period necessary for one oscillation, is extremely small for the light, rather large for an atom at the normal temperature, and extremely large at a very low temperature. In other words, the velocity (not the transmission velocity of action/reaction) is inversely proportional to the physical time speed. This re-confirms what I described in the preceding chapters. We should be aware that as the velocity v_2 of linear motion of particles inside an atom is very small, particles inside an atom behaves, receiving and concentrating much energy from outside (for instance, in direct contact with the electron-positron pairs of the vacuum) through extreme **anti-entropy** processes. This concentrated energy is then used for "self-organization", turning the "quantity" into "quality".

Artificial Neural Network model based on Newton's Anti-Entropy

In the domain of artificial neural network, conventional scientists talk about dendrites with weight values used as Linear coefficients and a synapse with threshold values, where the values are updated thousands of times with the rule of "backpropagation".in order to make the network "adapt" itself to the correspondence between the sets of input data and output data. They initially set the weight values and threshold values arbitrarily and randomly, and if the learning fails, they reset the values arbitrarily and randomly again. The rule of "back-propagation" is not really the rule of reaction.

That conventional modeling cannot explain why neurons construct Structured Protein for memory, which is indispensable for re-initializing input/output processes that the network experienced in the past, because the values that circulate inside their artificial neural network is neither physical energy nor electric current nor any physically meaningful quantity. They multiply ampere and ampere to obtain ampere, for instance.

Conventional scientists of (artificial or biological) neural networks believe that setting the values of weight and threshold values means learning and memorization. However, those networks with the set weights and threshold values could function, at best, only in case that network is Physically Shown a Real Input, (that is, an input that could be similar to some input it had seen in the past). How can they show the network the input data of an event that happened 50 years ago? No similar data exist in today's world. But we, humans sometimes remember quite in details what happened 50 years ago, though no real input is given. Why do animals dream? They remember something in

the past, though the real input absolutely no longer exists. One important mechanism that enables them is the production of structured protein by neurons and DNA, though I say later that this is not enough to carry out remembering consistently. For conventional neuro-scientists who model neural networks as I mentioned above, neurons seem to be something other than biological cells, in that they do not carry out life activities. Their neural network looks like an inorganic electric circuit (and moreover, they are doing extra-physical computations, multiplying ampere by ampere to obtain ampere). The neurons of their modeling do not gather energy through anti-entropy processes, though the real biological neurons should be intensively carrying out learning activities.

I model the neural network as a network of neurons acting and reacting according to Newton's third law, which allows non-linear modeling and allows to trace both scattering and concentration of energy information.

Accumulating energy through the **anti-entropy** process $v_1 > v_2 \Rightarrow F_1 < F_2$ is meaningful for a biological neuron in that, firstly, it can produce structured protein, and secondly, it gets a chance of taking part in a chain of learning neurons, without breaking down the communication chain at that neuron. v_1 and v_2, corresponding to "weights" of conventional modeling, signify here the thickness (diameter) of dendrites: if thick, the velocity of time is higher because of less friction, and if thin, the velocity of time is slower. If $v_1 < v_2 \Rightarrow F_1 > F_2$, information energy density is diluted and as the information energy density does not attain the level of the threshold value, the neuron cannot relay the input to the next neuron, thus breaking down the communication chain.

In conventional modeling of a neural network, the energy density will monotonically be diluted more and more, first, by the ramification of the route, and second, by the dropping out from communication because of threshold values. In my modeling of a neural network, a neuron can amplify the information energy density through **anti-entropy** processes, that is, $v_1 > v_2 \Rightarrow F_1 < F_2$. Therefore, the energy density are kept at a certain level in every corner, and will not necessarily come down even at the end of the neural network.

The transmission velocity is allowed to have a negative value, if the dendrite is used in reverse direction, reverse to the direction in which the dendrite is normally used. A neuron may have some dendrites through which it normally sends out information energy and other dendrites which it normally uses to receive information energy, the former of which have positive transmission velocities and the latter of which have negative transmission velocities. Because of the possibly negative value of transmission velocity, it is possible for the output to have zero or negative value.

As v_2 amplifies v_1, v_3 amplifies v_2, and so on, until v_n amplifies v_{n-1}, every time the quotient being multiplied as the energy information is sent out ahead, except in case the chain is

broken, the computation of real amplification is reduced to the ratio between the transmission velocity of the dendrite of the first input neuron and that of the last output neuron.

$$\frac{v_1}{v_2} \cdot \frac{v_2}{v_3} \cdot \frac{v_3}{v_4} \cdot \cdots \cdot \frac{v_{n-1}}{v_n} = \frac{v_1}{v_n}$$

At the input neuron, the energy information will be distributed to its dendrites in proportion to the absolute value of the transmission velocity of the dendrites.

In order for the neural network to learn from signal data, that is, correspondences between input information energy (energy density) and output information energy (each one of the vector elements of the input is assigned to each one of input neurons), the transmission velocity of dendrites of the output neuron (here considered to be a single output neuron) will be adjusted, and the transmission velocity of dendrites of the input neurons will be adjusted.

Let F_{1i} where $i = 1, 2, \ldots, m$ be input information energies and F_{2j} be an output information energy. So long as the connection between the "weights" or transmission velocities W_{1ik} (of a dendrite coming directly out of or going directly into an input neuron) and W_{2j} (of a dendrite going directly into or coming directly out of an output neuron) is not disconnected because of the rule of threshold value $W_1 < W_2 \Rightarrow F_1 > F_2$, that is, there is at least one connection between W_{1ik} and W_{2j}, then the following equation holds.

$$\sum_{i=1}^{m} \sum_{k=1}^{l} F_{1i} \cdot \frac{W_{1ik}}{W_{1i1} + W_{1i2} + \cdots + W_{1ik} + \cdots + W_{1il}} \cdot \frac{W_{1ik}}{W_{2j}} = F_{2j}$$

$$\sum_{j=1}^{n} F_{2j} = F_2$$
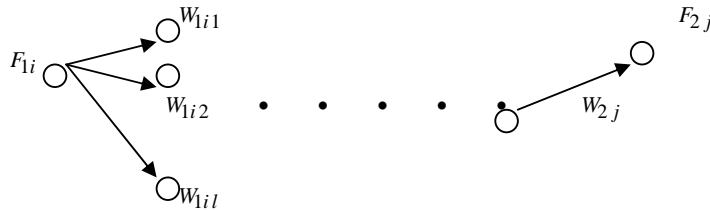
Applying Newton-Raphson's method, we can say approximately:

$$F_{2jd} - F_{2j} = f'(F_{1i}) \cdot (F_{1d} - F_{1i})$$

I derive algorithm for updating "weights". t and $t+1$ signify how many times we have cyclically applied the updating algorithm to obtain the value. The index d signifies the target output value.

$$\frac{F_{2jd} - F_{2j}(t)}{F_{1d} - F_{1i}(t)} = \frac{W_{1ik}(t)}{W_{2j}(t)}$$

$$\frac{F_{2jd} - F_{2j}(t+1)}{F_{1d} - F_{1i}(t+1)} = \frac{W_{1ik}(t+1)}{W_{2j}(t+1)}$$

$$\frac{W_{1ik}(t+1)}{W_{2j}(t+1)} - \frac{W_{1ik}(t)}{W_{2j}(t)} = \frac{F_{2jd}}{F_{1d} - F_{1i}(t+1)} - \frac{F_{2j}(t+1)}{F_{1d} - F_{1i}(t+1)} - \frac{F_{2jd}}{F_{1d} - F_{1i}(t)} + \frac{F_{2j}(t)}{F_{1d} - F_{1i}(t)}$$

$$= F_{2jd} \cdot \left(\frac{1}{F_{1d} - F_{1i}(t+1)} - \frac{1}{F_{1d} - F_{1i}(t)} \right) - F_{2j}(t) \cdot \left(\frac{\dfrac{F_{2j}(t+1)}{F_{2j}(t)}}{F_{1d} - F_{1i}(t+1)} - \frac{1}{F_{1d} - F_{1i}(t)} \right)$$

$$= F_{2jd} \cdot \frac{F_{1d} - F_{1i}(t) - F_{1d} + F_{1i}(t+1)}{\{F_{1d} - F_{1i}(t+1)\}\{F_{1d} - F_{1i}(t)\}} - F_{2j}(t) \cdot \left(\frac{\dfrac{F_{2j}(t+1)}{F_{2j}(t)}}{F_{1d} - F_{1i}(t+1)} - \frac{1}{F_{1d} - F_{1i}(t)} \right)$$

as we suppose that the value of the function does not change much at first and then abruptly it

converges, $\quad F_{1i}(t+1) - F_{1i}(t) \cong F_{1d} - F_{1i}(t) \quad$ and $\quad \dfrac{F_{2j}(t+1)}{F_{2j}(t)} \cong 1$

$$\cong \frac{F_{2jd} - F_{2j}(t)}{F_{1d} - F_{1i}(t+1)} \cong \frac{F_{2jd} - F_{2j}(t)}{F_{1d} - F_{1i}(t)} \cong -\eta \cdot \frac{F_{2jd} - F_{2j}(t)}{F_{1i}(t)}$$

Hence: $\quad \dfrac{W_{1ik}(t+1)}{W_{2j}(t+1)} = \dfrac{W_{1ik}(t)}{W_{2j}(t)} - \eta \cdot \dfrac{F_{2jd} - F_{2j}(t)}{F_{1i}(t)}$

By introducing logistic activation function just as neuroscientists do, we postulate updating algorithm for the weights of the output neuron and those of the input neurons:

$$W_{2j}(t+1) = W_{2j}(t) \cdot \left| \frac{Min(F_{2j}(t), F_{2jd})}{Max(F_{2j}(t), F_{2jd})} \right| \cdot \left(1 - \left| \frac{Min(F_{2j}(t), F_{2jd})}{Max(F_{2j}(t), F_{2jd})} \right| \right)$$

$$W_{1ik}(t+1) = \left(W_{1ik}(t) + \eta \cdot \frac{F_{2j}(t) - F_{2jd}}{F_{1i}(t)} \right) \cdot \left| \frac{Min(F_{2j}(t), F_{2jd})}{Max(F_{2j}(t), F_{2jd})} \right| \cdot \left(1 - \left| \frac{Min(F_{2j}(t), F_{2jd})}{Max(F_{2j}(t), F_{2jd})} \right| \right)$$

This is an artificial neural network model in which the sent out energy is canceled to zero by the reaction in the neuron when the energy is passed to the neuron of the next layer. In other words, this is a real physical energy model of a neural network. On the other hand, the improved GMDH (Group Method for Data Handling) network derived from the equation (2) for a many-body problem, I am talking about later in this dissertation, processes input numbers without physical unit (relative ratio) and the input is not supposed to be consumed when processed. Both the above-mentioned neural network model and the GMDH model I mention later are the two necessary components of my learning network system. GMDH will compute what relative ratio of energy is involved in each macro-level parameter, which is a relative ratio without physical unit.

The relative energy calculated by GMDH is used as an input and an output of the above mentioned neural network (In case of a real neural network, it is electric energy that is input and output). Otherwise, generally speaking, no one knows what size of input energy and output energy a neural network should process. GMDH simulates the causality chaining processes in the real physical world, whereas the above-mentioned neural network simulates the perception and reasoning in the brains. "Correlation" in statistics shows only that two events seem to occur at the same time, but does not tell which of the two events is the cause and which is the consequence (there is no orientation), nor does it tell whether the simultaneous occurrence is only accidental or not. GMDH is an attempt to Supplant the position of the statistical methodology "correlation" which is so widely used for classification of data in many domains. GMDH has an orientation from input to output, that is, it represents the causality chain.

Criticism of conventional neuroscience

 In the chapter of DNA of this dissertation, I said:

Especially when the chromosome forms a ring structure (or a Moebius band if the number of nucleotide is odd) with the two ends connected, this time delay could be repeated and accumulated without limit, which could bring about very high anti-entropy processes. In case a Moebius band, a non-orientable object, is formed, the electrons and positrons on the right hand side and the left hand side are completely merged along the track of the Moebius band, which enables to freely go back and forth in the time axis.

 In the chapter of economics of this dissertation, I said that the longer the time the attention is paid, the more the effect of anti-entropy and learning. The neural network in the brains have a structure of Klein's tube. The structure of non-orientable objects like a Moebius band or a Klein's tube, allows to unlimitedly prolong the time the attention is paid. Prof. Terry Sejnovski of Salk Institute, USA, wrote me on Dec. 22, 1998: "The energy scale of cellular mechanism is much higher than that of quantum effects." The anti-entropy processes inside the neural network can surmount not only this difficulty of energy (amplifying the density of energy according to Newton's action/reaction law) but also the problem of "lack of input signal". In a preceding paragraph of this dissertation, I referred to neuron's producing protein (using the surplus energy accumulated through anti-entropy processes), which should trigger an input signal similar to the one input to the neural network long time in the past. Otherwise, the structure of the neural network itself, though conserving the learned effect, cannot trigger itself for remembering events in the past. In fact, "long time memory absolutely depends on the synthesis of new proteins or the increased synthesis of already existing proteins. ("Learning and Memory: Biological View"; Joe. L. Martinez & Raymond Kesner; Academic Press; P. 235)" However, as I pointed out earlier, protein is not enough to remember consistently. The number of differently structured proteins

synthesizable with only 30 or 40 kinds of amino acids (including the basic 20 of alpha-amino acids, GABA for neurons, etc.) is not sufficient at all to carry out a remembering process. In human brains, for instance, there are 10^{11} or 10^{12} neurons. In order to memorize each of which neuron is connected to each of which neuron, or each of which neuron acted and reacted with each of which neuron, as $10^{11} = 2^{33}$, we need 33 different structures of protein. In order to memorize even only one action/reaction between a pair of neurons inside the entire neural network, we need $33^{10^{11}}$ differently structured proteins. This order of magnitude of kinds of proteins is absolutely not synthesizable. The codon of m-RNA is capable of producing $4^3 = 64$ kinds of triplet which is coupled with 60 anti-codons of t-RNA. There are approximately 100,000 genes on DNA. So, let us compare $(64 \cdot 60)^{10^5}$ with $33^{10^{11}}$. If we take a logarithm of them,

$$\log_{10}(64 \cdot 60)^{10^5} = 100{,}000 \cdot (\log_{10} 38.4 + \log_{10} 100) \cong 100{,}000 \cdot (1.5 + 2) = 3.5 \cdot 100{,}000 \qquad \text{whereas}$$

$$\log_{10} 33^{10^{11}} = 10^{11} \cdot \log_{10} 33 \cong 1.5 \cdot 100{,}000{,}000{,}000 \text{. Hence it is evident that } (64 \cdot 60)^{10^5} << 33^{10^{11}}.$$

Even if we hypothesize that entire 2,000,000 introns (pseudogenes) in addition to 100,000 genes were working, and if we compare $(64 \cdot 60)^{2 \cdot 10^6}$ with $33^{10^{11}}$,

$$\log_{10}(64 \cdot 60)^{2 \cdot 10^6} = 2{,}000{,}000 \cdot (\log_{10} 38.4 + \log_{10} 100) \cong 2{,}000{,}000 \cdot (1.5 + 2) = 7.0 \cdot 1{,}000{,}000 \text{ so this does not}$$

make so much difference, either.

This means that even for one remembering action of the brains the number of synthesizable protein structures is far less sufficient. Needless to say, proteins can not at all memorize the information quantity necessary to carrying out multiple remembering actions. It is absolutely impossible to memorize what happened in the course of years.

The reason why the project of US cognitive scientist Roger Schank's "Case-Based Reasoner" trying to classify and memorize all sorts of events taking place in the world, revealed that no imaginable memory size of any imaginable super-computer or networks of super-computers, is not sufficient at all for reasoning by analogy about events, is this problem of the order of magnitude of necessary memory. The reason why animals' brains or human brains are capable of remembering so many past events and sometimes so clearly in detail, is according to my point of view, due to the "time machine effect" of Klein's tube structure of the brains, that allows to freely go back and forth along the time axis. Otherwise, the working magnitude of memory is unexplainable.

Criticism of Conventional Information theories

I defined the quantity of information as the sum of the absolute value of physical energy of all

the past and future action/reaction processes that bring about the deformation of the vacuum space where that information is. In order that today humans may carry out highly symbolic reasoning, that symbolic reasoning should be supported by prior biological evolutionary processes that brought about human being on earth, and by physical computation of the neural networks consuming physical energy, which is brought about basically by action/reaction of particles interacting along delayed or advanced time axis, where time delay causes anti-entropy processes to take place, allowing concentration of energy. Today's conventional information theories statistically define "information", which, unconvertible to physical energy or physical entropy, is purely symbolic and has absolutely no relation whatsoever to the physical or biological world. That is a failure.

Their failure is revealed especially when the conventional information theories talk about "measure" of metric space for information processing. Their view points are "static" in that they introduce the concept of measure to find out "similarity" and only to Classify the information, but not to Learn from the information data, and thus in the end they fail even in correctly classifying the information. Their approach lacks in analyzing dynamic action/reaction processes of information in this physical world. Each of conventional information theoreticians subjectively gives a purely symbolic or mathematical "measure" not related to the physical world, just as he pleases.
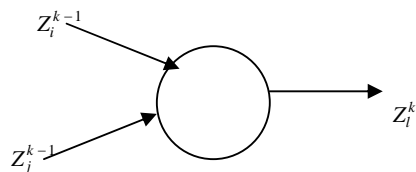
If we have to introduce abstract coordinate axes in order to process information, each of the abstract coordinate axes should be given measures based on the time rate or Action related to those coordinates. A coordinate of slower tempo is an attribute more fundamental than those of faster tempo, because the coordinate of slower tempo concerns anti-entropy processes.

Moreover, each kind of the human activities should be "measured" by a gene or a combination of genes, each of which should have been studied of its time rate of action/reaction processes.

GMDH and its relation with the equation (2): Prof. A.P. Smirnov's equation(31)

Group Method of Data Handling (GMDH) originally proposed by A. G. Ivanenko in 1968 is a learning network based on polynomials. When two inputs Z_i^{k-1} and Z_j^{k-1} are given to a node, the output Z_l^k is calculated according to the following formula (note that superscripts are used both to indicate the layer number and for exponentiation; parentheses are used for exponents to help avoid confusion):

$$Z_l^k = a_l^k (Z_i^{k-1})^2 + b_l^k (Z_i^{k-1})(Z_j^{k-1}) + c_l^k (Z_j^{k-1})^2 + d_l^k Z_i^{K-1} + e_l^k Z_j^{k-1} + f_l^k \qquad \text{(a)}$$

GMDH network builds up a polynomial combination of the input components. Each added one layer of the network increases the degree of the polynomial expression by two. The output of the network can be expressed as a polynomial of degree $2n$, where n is the number of layers in the network counted from the input layer. GMDH network is developed, starting from the input layer and growing the network progressively toward the output layer. If the number of nodes in the previous layer is M_{k-1}, we start with the number of processing elements in layer k equal to $M_{k-1}C_2$. The basic idea of GMDH is that each node wants to have its output match the training output vector as closely as possible for each training input vector.
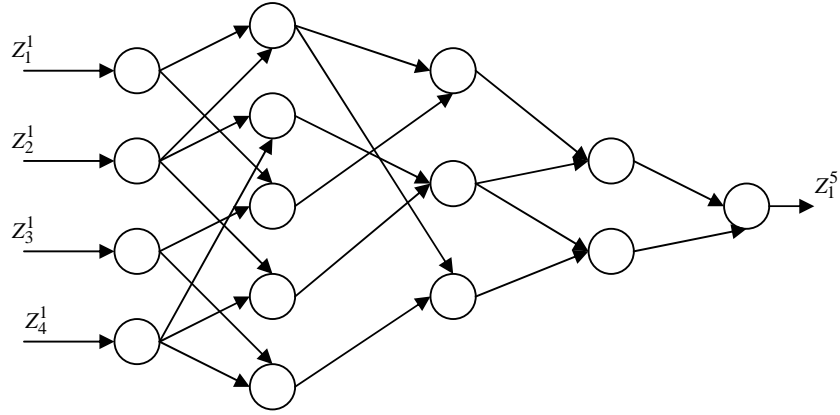
The process of adjusting the six coefficients of each node is carried out using a set of input/output training examples. We construct six simultaneous equations, each time using six input/output training examples. Hence, the equation (a) can be re-written as a matrix representation:

$$
\begin{bmatrix}
(_1Z_i^{k-1})^2 & (_1Z_i^{k-1})(_1Z_j^{k-1}) & (_1Z_j^{k-1})^2 & _1Z_i^{k-1} & _1Z_j^{k-1} & 1 \\
(_2Z_i^{k-1})^2 & (_2Z_i^{k-1})(_2Z_j^{k-1}) & (_2Z_j^{k-1})^2 & _2Z_i^{k-1} & _2Z_j^{k-1} & 1 \\
(_3Z_i^{k-1})^2 & (_3Z_i^{k-1})(_3Z_j^{k-1}) & (_3Z_j^{k-1})^2 & _3Z_i^{k-1} & _3Z_j^{k-1} & 1 \\
(_4Z_i^{k-1})^2 & (_4Z_i^{k-1})(_4Z_j^{k-1}) & (_4Z_j^{k-1})^2 & _4Z_i^{k-1} & _4Z_j^{k-1} & 1 \\
(_5Z_i^{k-1})^2 & (_5Z_i^{k-1})(_5Z_j^{k-1}) & (_5Z_j^{k-1})^2 & _5Z_i^{k-1} & _5Z_j^{k-1} & 1 \\
(_6Z_i^{k-1})^2 & (_6Z_i^{k-1})(_6Z_j^{k-1}) & (_6Z_j^{k-1})^2 & _6Z_i^{k-1} & _6Z_j^{k-1} & 1
\end{bmatrix}
\cdot
\begin{bmatrix}
a_l^k \\ b_l^k \\ c_l^k \\ d_l^k \\ e_l^k \\ f_l^k
\end{bmatrix}
=
\begin{bmatrix}
_1Z_l^k \\ _2Z_l^k \\ _3Z_l^k \\ _4Z_l^k \\ _5Z_l^k \\ _6Z_l^k
\end{bmatrix}
$$

Thus the six coefficients are calculated as:

$$
\begin{bmatrix}
a_l^k \\ b_l^k \\ c_l^k \\ d_l^k \\ e_l^k \\ f_l^k
\end{bmatrix}
=
\begin{bmatrix}
(_1Z_i^{k-1})^2 & (_1Z_i^{k-1})(_1Z_j^{k-1}) & (_1Z_j^{k-1})^2 & _1Z_i^{k-1} & _1Z_j^{k-1} & 1 \\
(_2Z_i^{k-1})^2 & (_2Z_i^{k-1})(_2Z_j^{k-1}) & (_2Z_j^{k-1})^2 & _2Z_i^{k-1} & _2Z_j^{k-1} & 1 \\
(_3Z_i^{k-1})^2 & (_3Z_i^{k-1})(_3Z_j^{k-1}) & (_3Z_j^{k-1})^2 & _3Z_i^{k-1} & _3Z_j^{k-1} & 1 \\
(_4Z_i^{k-1})^2 & (_4Z_i^{k-1})(_4Z_j^{k-1}) & (_4Z_j^{k-1})^2 & _4Z_i^{k-1} & _4Z_j^{k-1} & 1 \\
(_5Z_i^{k-1})^2 & (_5Z_i^{k-1})(_5Z_j^{k-1}) & (_5Z_j^{k-1})^2 & _5Z_i^{k-1} & _5Z_j^{k-1} & 1 \\
(_6Z_i^{k-1})^2 & (_6Z_i^{k-1})(_6Z_j^{k-1}) & (_6Z_j^{k-1})^2 & _6Z_i^{k-1} & _6Z_j^{k-1} & 1
\end{bmatrix}^{-1}
\cdot
\begin{bmatrix}
_1Z_l^k \\ _2Z_l^k \\ _3Z_l^k \\ _4Z_l^k \\ _5Z_l^k \\ _6Z_l^k
\end{bmatrix}
$$

When the coefficients are obtained for the nodes of the same layer, we select the best nodes in

terms of minimizing the sum of absolute errors between the output of the nodes and the desired output. The nodes and links which are not selected as the best ones will be eliminated and truncated. When the preciseness begins to degrade, we stop developing a new layer, and finally selects the best one node of the last layer, eliminating and truncating all other nodes and links.

This learning network model, GMDH, is, after all, the best and the most powerful model ever known in "connectionist" technologies. However, conventional connectionists allowed not only artificial neural networks but also the GMDH network to process any kind of inputs and outputs, which should be criticized. They added physically meaningless values (in fact they don't find it strange to add price and temperature and volume of sound, for instance, of different physical units) in neural networks, and in addition to that, in case of GMDH, multiplied them, or raised to higher power and added them again. Even in an abstract computation, we should avoid physically meaningless combination. As I show below that the left hand side of the equation (2') is pseudo-equivalent to GMDH, we should limit the input parameters of GMDH to those without physical unit (statistically "normalized" parameters often used in conventional GMDH should not be allowed), that is, parameters representing Concrete Percentage in terms of attributes, but NOT probability.

Let us review the equation (2) again, where D and D_p are energies: $D = E$, $D_p = E_p$, and where $k = 1$, which is the 3 dimensional case

$$\ln \frac{M}{M_0 - M} - \ln \frac{M_p}{M_0 - M_p} = a_p \left| \frac{D - D_p}{D_p} \right|^{k/2} = a_p \left| \frac{E - E_p}{E_p} \right|^{k/2} \qquad (2')$$

$$\left(\ln \frac{M_0 - M_p}{M_p} - \ln \frac{M_0 - M}{M} \right)^2 = a_p^2 \left| \frac{E - E_p}{E_p} \right|^k = a_p^2 \left| \frac{E - E_p}{E_p} \right|$$

Taylor development of the logarithmic function is:

$$f(x) = \ln x = \frac{f^{(0)}(p)}{0!}(x - p)^0 + \frac{f^{(1)}(p)}{1!}(x - p)^1 + \frac{f^{(2)}(p)}{2!}(x - p)^2 + \cdots$$

$$= \ln p + \frac{1}{p}(x - p) - \frac{1}{2p^2}(x - p)^2 + \cdots$$

If we introduce two numbers q and u which are close to $\frac{M_0 - M_p}{M_p}$ and $\frac{M_0 - M}{M}$ respectively,

and ignore terms of higher degrees than one, the left hand side of (2') can be re-written as:

$$\ln \frac{M_0 - M_p}{M_p} - \ln \frac{M_0 - M}{M} = \left\{ \ln q + \frac{1}{q} \left(\frac{M_0 - M_p}{M_p} - q \right) - \cdots \right\} - \left\{ \ln u + \frac{1}{u} \left(\frac{M_0 - M}{M} - u \right) - \cdots \right\}$$

$$= (\ln q - \ln u) + \frac{1}{q}\left(\frac{M_0}{M_p} - 1 - q\right) - \frac{1}{u}\left(\frac{M_0}{M} - 1 - u\right) - \cdots$$

$$= (\ln q - \ln u - \frac{1}{q} + \frac{1}{u}) + \frac{1}{q}\left(\frac{M_0}{M_p}\right) - \frac{1}{u}\left(\frac{M_0}{M}\right) \cdots$$

$$a_p^2 \cdot \left|\frac{E - E_p}{E_p}\right| = \left(\ln\frac{M_0 - M_p}{M_p} - \ln\frac{M_0 - M}{M}\right)^2$$

$$\cong \left(\frac{1}{q}\left(\frac{M_0}{M_p}\right) - \frac{1}{u}\left(\frac{M_0}{M}\right) + (\ln q - \ln u - \frac{1}{q} + \frac{1}{u})\right)^2$$

If we put $Z_1 = \dfrac{M_0}{M_p}$ and $Z_2 = \dfrac{M_0}{M}$, this formula can be written in the form:

$$= \left(\frac{1}{q}Z_1 - \frac{1}{u}Z_2 + \left(\ln q - \ln u - \frac{1}{q} + \frac{1}{u}\right)\right)^2$$

$$= \frac{1}{q^2}Z_1^2 - \frac{2}{qu}Z_1Z_2 + \frac{1}{u^2}Z_2^2 + \frac{2}{q}\left(\ln q - \ln u - \frac{1}{q} + \frac{1}{u}\right)Z_1 - \frac{2}{u}\left(\ln q - \ln u - \frac{1}{q} + \frac{1}{u}\right)Z_2 + \left(\ln q - \ln u - \frac{1}{q} + \frac{1}{u}\right)^2$$

$$= a Z_1^2 + b Z_1 Z_2 + c Z_2^2 + d Z_1 + e Z_2 + f$$

This is the GMDH polynomial. The equation derived above shows what relative ratio of energy is involved in the interaction process of each of macro-level parameters. And when a GMDH network of multiple layers is constructed, its structure shows what parameters of relative ratios of energy are involved in what order in the interacting chaining processes. Energy computed from this relative ratio of energy is then used as input to the aforementioned computational model of the neural network, which then computes energies of what real size are output from the neural network. The size of energy, which represents the strength of motivation, plays an important role when an animal or a human makes a decision. GMDH shows in what order the macro-level parameters interacted in the CAUSALITY CHAIN to produce the resulting output. When a GMDH network converges after a learning process, the learned ratio of the six coefficients is normally found to have a value deviated from the above-mentioned theoretical ratio of six coefficients:

$$a : b : c : d : e : f \neq \frac{1}{q^2} : \left(-\frac{2}{qu}\right) : \frac{1}{u^2} : \frac{2}{q}\left(\ln q - \ln u - \frac{1}{q} + \frac{1}{u}\right) : \frac{2}{u}\left(\ln q - \ln u - \frac{1}{q} + \frac{1}{u}\right) : \left(\ln q - \ln u - \frac{1}{q} + \frac{1}{u}\right)^2$$

The cause of the deviation is the so-called "noise", that is, the noise caused by the micro-oscillation of the physical time (noise produced by a circular rotation without any bias). This means that GMDH has a capability of absorbing noise, and a capability of learning in spite of noise if only the noise does not totally damage the information signal.

  It will also be an interesting attempt to apply "noise equations" of major physical entities for eliminating noise, which I mentioned in my thesis, before we apply the GMDH polynomials.

III. PHASE III: Quantization of Action in terms of Time, using the Screw Model

Compton scattering, example of non-conservation of energy, revisited

In my thesis, I demonstrated that the equation of Compton scattering can be derived by combining my micro-oscillation of physical time and the uncertainty principle, taking into account some hypothesis of my model of screw-structured particles based on Newton's third law. I here again demonstrate the equation of Compton scattering by introducing the Newton's action/reaction term of collision into the set of momentum equations, which signifies Compton scattering can be fully explained by classical Newtonian physics with the original Newton's third law. In order to derive the equation, Einstein and Compton had used the same momentum equations into which they could not but introduce relativistic energy conservation law (because otherwise they could never derive it), though the velocity of the scattered electron is some centimeters per second, without explicitly saying that they could not but use non-zero mass of their "photon".

In Compton scattering, except the short intervals of time in which the electron and the electron of electron-positron pairs of vacuum interact, momentum conservation holds. But because of that interaction, energy conservation does not hold. The number of electron-positron pairs taking part in the action/reaction of Compton scattering is: $\nu - \nu'$. If conservation of energy had held, the following equation would have held, because kinetic energy of an electron-positron pair of vacuum is Plank constant:

$$\frac{1}{2}m_e v^2 = \frac{1}{2}m_{e^-e^+} c^2 \cdot (\nu - \nu') = \frac{1}{2}\frac{2\hbar}{c^2}c^2 \cdot (\nu - \nu') = \hbar \cdot (\nu - \nu') \quad \text{(a)} \qquad \text{where} \quad m_{e^-e^+} = \frac{2\hbar}{c^2}$$

However, this energy conservation is not right, and we have to add another term coming from the interaction between the free electron and $\nu - \nu'$ electron-positron pairs. Otherwise, the equation of Compton scattering will never hold.

The action/reaction equation of Newton's third law for one electron of an electron-positron pair of vacuum interacting with the free electron, can be written as:

$$m_e \frac{dv}{dt} \cdot v_{\text{int}} = -m_{e^-e^+} \frac{dc}{dt} \cdot v_{\text{int}} \qquad \text{(b)}$$

where the so-called velocity c of light is the total distance the electron-positron pair travels (in fact, one can say so because rotation of the screw sends the groove forward at that velocity) for the time period of one action with the acceleration $\frac{dc}{dt}$. Please note also that as it is an electron (not other sorts of particles) that the screw of the electron of the electron-positron pair clutches, during the interaction of Compton scattering, both the free electron and the electron-positron pair move at the same velocity v_{int}. If we omit v_{int} of both sides of (a) and integrate both sides

with regard to the time, we get:

$$m_e \cdot \Delta v = -m_{e^-e^+} \cdot c$$

If we square both sides, we get: $\qquad m_e^2 \cdot (\Delta v)^2 = m_{e^-e^+}^2 \cdot c^2$

If we divide both side with m_e and then multiply by $\frac{1}{2}$, we get:

$$\frac{1}{2} m_e \cdot (\Delta v)^2 = \frac{1}{2} m_{e^-e^+} \frac{m_{e^-e^+}}{m_e} c^2 = \frac{1}{2 m_e} \left(\frac{\hbar}{c} \right)^2$$

This is exactly the term we have to add to the right hand side of the equation (a). The equation (a) is now:

$$\frac{1}{2} m_e v^2 = \frac{1}{2 m_e} \left(\frac{\hbar}{c} \right)^2 (v - v') + \frac{1}{2} m_{e^-e^+} c^2 \cdot (v - v') = \frac{1}{2 m_e} \left(\frac{\hbar}{c} \right)^2 (v - v') + \hbar \cdot (v - v') \qquad \text{(a')}$$

I apply this equation to the equation Compton and Einstein derived for momentum conservation, which they used differently, from relativistic point of view, not justifying why relativistic energy is indispensable for the derivation when the velocity of the free electron is some centimeters per second. The equations of momentum conservation are:

$$p \cdot \sin \alpha = \frac{h v'}{c} \cdot \sin \theta \qquad \text{(c)}$$

$$\frac{h v}{c} = p \cdot \cos \alpha + \frac{h v'}{c} \cos \theta \qquad \text{(d)}$$

If we eliminate α from (c) and (d), we get:

$$p^2 = \left(\frac{h}{c} \right)^2 (v - v')^2 + \frac{2 h^2 v v'}{c^2} (1 - \cos \theta) \qquad \text{(e)}$$

As $p = m_e v$, (e) can be rewritten as:

$$m_e v^2 = \frac{h^2}{m_e} \left(\frac{v}{c} - \frac{v'}{c} \right)^2 + \frac{2 h^2 v v'}{m_e c^2} (1 - \cos \theta)$$

$$\frac{1}{2} m_e v^2 = \frac{h^2}{2 m_e} \left(\frac{v}{c} - \frac{v'}{c} \right)^2 + \frac{h^2 v v'}{m_e c^2} (1 - \cos \theta) \qquad \text{(f)}$$

If we compare (a') and (f), we get the following equation. Please note that thanks to the cancellation of the aforementioned "interaction term", the following equation becomes so simplified (For later discussion, I here note also that the "interaction term" is relatively small compared with the second term on the right-hand side of the equations (a') and (f), if the frequency of oscillation of the light is high; and is relatively large if the frequency of the light is small.):

$$h \cdot (v - v') = \frac{h^2 v v'}{m_e c^2} (1 - \cos \theta)$$

If we divide both sides by $\dfrac{h\nu\nu'}{c}$, we get:

$$\frac{c}{\nu'} - \frac{c}{\nu} = \frac{h}{m_e c}(1 - \cos\theta)$$

As the definition of $\Delta\lambda$ is: $\Delta\lambda = \dfrac{c}{\nu'} - \dfrac{c}{\nu}$, we get:

$$\Delta\lambda = \frac{h}{m_e c}(1 - \cos\theta)$$

This is the equation of Compton scattering. Please note again that thanks to the cancellation of the aforementioned "interaction term", the equation becomes so simplified In my thesis and in this dissertation, I have reasoned about Compton scattering three times. This time, I derived the equation based on evaluation of the **quantity** of **action** according to Newton's original third law.

Red Shift and Time Delay

The experimental result of red shift in gravitational field is known to be given by:

$$\frac{\omega_0}{\varpi_s} = 1 + \frac{1}{c^2}(\Phi_s - \Phi_0) \qquad \text{(a)}$$

where Φ_s and Φ_0 are the Newtonian gravitational potential, and ω_s and ω_0 are the angular frequency at the source and at the location of observation. This phenomenon can be well explained by my screw-structured model of electron-positron pairs of vacuum. If the source of the light is at a lower position than the observer in a gravitational field, the light coming up to the observer is carried by a chain of electron-positron pairs of vacuum in which the electron and the positron disengage from each other a little bit. Because of the disengagement, the electron and the positron now have non-zero mass, which is pulled by the centripetal force of gravity and decelerated. This deceleration signifies slower rotation of the electron-positron pair toward the observer, in other words, $\omega_0 < \omega_s$, so the red shift occurs. If the source of the light is at a higher position than the observer in the gravitational field, $\omega_0 > \omega_s$.

Moreover, based on the screw-model with the hypothesis of electron-positron pairs along the light trajectory of vacuum with slight mass being pulled by gravity, we can derive the aforementioned time-delay equation (a) of red shift in gravitational field. If l is the height distance, the time necessary for the light to traverse that distance is:

$$\frac{l}{c} = t \qquad\qquad \text{(b)}$$

According to Newton's equation of motion: $v = v_0 + at = c + gt$ $\qquad\qquad$ (c)

This means the electron-positron pair carrying the light at the velocity v could be even more accelerated by gravity and could surpass the velocity of light c. From (b) and (c),

$$v - c = \frac{g\,l}{c} \qquad \text{so,} \qquad \frac{v - c}{c} = \frac{g\,l}{c^2}$$
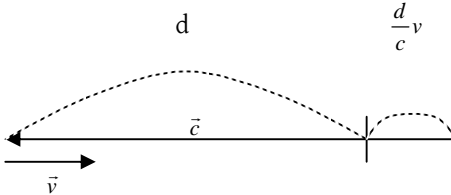
As $g\,l = \Phi_s - \Phi_0$ and as in the screw model, the ratio of velocity at which a particle is carried is equal to ratio of the angular velocity at which the particle is rotating $\frac{v - c}{c} = \frac{\omega_0 - \omega_s}{\omega_s}$, we get:

$$\frac{\omega_0 - \omega_s}{\omega_s} = \frac{1}{c^2}(\Phi_s - \Phi_0)$$

which we find equivalent to (a). This verification saying that the light velocity can both increase and decrease under the influence of gravity, justifies also that the light velocity is variable, which I referred to in the last chapter.

This time-delay/advance under gravitational field constitute the fundamental time delay/advance. It is "fundamental" in that the time delay/advance is directly observable as the change of frequency of the observed light. The red shift under Doppler effect, which is another kind of red shift, is a combined result of fundamental time-delay caused by motion and pure Doppler effect. Red shift under the effect of the expansion of the Universe is essentially the same kind of question as Doppler effect. So let me explain the case of Doppler effect.

If fundamental time-delay/advance did not take place even if the observer moves at the speed $\vec{v}$, the pure Doppler effect would change the frequency of the light wave as:

$$\omega_0 = \omega_s \frac{d + \frac{d}{c}v}{d} = \omega_s(1 + \frac{v}{c})$$

for the case in which the observer is approaching the origin of light, and similarly

$$\omega_0 = \omega_s \frac{d - \frac{d}{c}v}{d} = \omega_s(1 - \frac{v}{c})$$

for the case in which the observer is going away from the origin of light. In general, in case the observer is moving in the direction at the vector speed $\vec{v}$;

$$\omega_0 = \omega_s(1 - \frac{\vec{c} \cdot \vec{v}}{|\vec{c}|^2})$$

However, this does not yet precisely represent the frequency change in case the observer is in motion under no gravity, because we have to take into account the time-delay/advance caused by the motion of the observer against the ether. First, the gravitational potential of an electron-positron pair is replaced by its kinetic energy, obtained by adding up the mass of the

electron and that of the positron, the latter of which in an isolated state had negative mass but now functions as a positive mass, because as a combined pair with the electron, the positron spiral can no longer rotate freely.

$$\frac{\omega_0 - \omega_s}{\omega_s} = \frac{1}{c^2}(\Phi_s - \Phi_0) = \frac{1}{c^2}(g\,l_s - g\,l_0) \qquad \text{where } m \text{ is considered } 1$$

$$\frac{t_0 - t_s}{t_s} = \frac{1}{c^2}\left\{\frac{1}{2}(m+m)c^2 - \frac{1}{2}(m+m)v^2\right\} \qquad \text{where } m \text{ is put equal to } 1$$

$$= \frac{c^2 - v^2}{c^2} = \frac{1}{T_s^2} = 1 - \frac{v^2}{c^2}$$

As the gravitational potential in the original equation supposes unit mass, after all, m is put equal to 1. After the transformation, ω_0 and ω_s are replaced by t_0 and t_s, because ω_0 and ω_s no longer mean explicit angular velocity of the particles but the quotient means the time delay ratio caused by the linear motion. The result of pure Doppler effect has still to be multiplied by the internal time delay ratio $T_s = \dfrac{1}{\sqrt{1 - \left(\dfrac{v}{c}\right)^2}}$.

where the square root appears as a square-root distance ratio of Minkowski time-space. Hence, the combined change of angular velocity is:

$$\omega_0 = \omega_s \frac{1 - \dfrac{\vec{c}\cdot\vec{v}}{|\vec{c}|^2}}{\sqrt{1 - \left(\dfrac{v}{c}\right)^2}}$$

The experimental equation of red shift without gravity but with the origin of light and the observer moving at different speeds, under Doppler effect, is thus derived.

However, from the point of view of the screw-structured model of electron-positron pairs of vacuum, $\vec{c}$ of $\dfrac{\vec{c}\cdot\vec{v}}{|\vec{c}|^2}$ and c of $\left(\dfrac{v}{c}\right)^2$ are the velocities of different "lights", or more precisely, the former c is the velocity of the observed light by the observer, while the latter is the velocity of the propagation of action/reaction among the electron-positron pairs of the vacuum, that is, the propagation velocity of the action that the observer gave to the electron-positron pairs of vacuum.

Mechanism of how the micro-oscillation of physical time is generated

Now let us consider the case in which the observer staying with the dynamic ether that

surrounds him is not observing a light, but is observing his extremely precise clock. The electron-positron pairs are rotating. The observer goes away at the relative propagation velocity c from the origin of the action he left on a pair of electron-positron of the vacuum, so, in the above equation, $\vec{c}$ of $\dfrac{\vec{c}\cdot\vec{v}}{|\vec{c}|^2}$ and c of $\left(\dfrac{v}{c}\right)^2$ are the velocities of the same "light", and moreover, $|\vec{v}| = c$.

The action emitted by the rotating electron-positron pair propagates in all directions. Thus, for a rotating action circle of electron-positron pairs of vacuum, the following equation holds:

$$\omega_0 = \omega_s \frac{1 - \dfrac{\vec{c}\cdot\vec{v}}{|\vec{c}|^2}}{\sqrt{1 - \left(\dfrac{\vec{c}\cdot\vec{v}}{|\vec{c}|^2}\right)^2}}$$

$$\omega_0 = \omega_s \sqrt{\frac{1 - \dfrac{\vec{c}\cdot\vec{v}}{|\vec{c}|^2}}{1 + \dfrac{\vec{c}\cdot\vec{v}}{|\vec{c}|^2}}}$$

As $|\vec{v}| = c$, $\dfrac{\vec{c}\cdot\vec{v}}{|\vec{c}|^2} = \dfrac{|\vec{c}|\cdot|\vec{v}|\cdot\cos\theta}{|\vec{c}|^2} = \dfrac{|\vec{c}|\cdot|\vec{c}|\cdot\cos\dfrac{2\pi\cdot mc^2}{\hbar}t}{|\vec{c}|^2} = \cos\dfrac{2\pi\cdot mc^2}{\hbar}t$

So, $\qquad \omega_0 = \omega_s \sqrt{\dfrac{1 - \cos\dfrac{2\pi\cdot mc^2}{\hbar}t}{1 + \cos\dfrac{2\pi\cdot mc^2}{\hbar}t}} = \omega_s\sqrt{\dfrac{dt'}{dt}}$

Analysis of the structure of a lever and a screw applied to the electron-positron pair

Newton's original third law was:

$F_1 \cdot v_1 = -F_2 \cdot v_2$

Let us think about the case of a lever. If the structural ratio of the fulcrum dividing the handle of the lever is, for instance, $3 : 1$, then both ratios $|v_1| = 3|v_2|$ and $3|F_1| = |F_2|$ are already determined. What force F_1 will be necessary depends on what mass to lift (hit) with the force F_2 at the other end of the handle. This is an action/reaction model of collision in general, in which the velocities v_1 and v_2 are in linear motion.

Let us now consider the case of a screw. The structural ratio is now the gradient, that is, the ratio of the length of advance versus the length of slope, the latter of which is, in fact, rotational. The actor's velocity and its force are in the rotational direction, which is perpendicular to the linear direction of the velocity and that of the pushing force. Just like the case of the lever, if the

structural gradient is, for instance, $3:1$, then both ratios $|v_1| = 3|v_2|$ and $3|F_1| = |F_2|$ are already determined. What force F_1 will be necessary depends on what mass to push (hit) with the force F_2 at the other end of the screw. This is also an action/reaction model in general, in which the velocity v_1 is rotational and v_2 is in linear motion.

Let us now apply this screw model to the electric or gravitational action/reaction via a field full of screw-structured electron-positron pairs. Let us put the equation of Newton's third law for two mass located at first at a distance x_2.

$$m_1 \frac{\Delta\left(\frac{\Delta x_2}{\Delta t}\right)}{\Delta t} \cdot \frac{\Delta x_1}{\Delta t} = -m_2 \frac{\Delta\left(\frac{\Delta x_1}{\Delta t}\right)}{\Delta t} \cdot \frac{\Delta x_2}{\Delta t} \qquad\qquad \text{(a)}$$

If we reduce the distance between the two mass to $x_2/3$, according to the "One Action One Rotation" principle and Kozyrev's constant velocity of action transmission (that I am going to precisely demonstrate in a later chapter of this dissertation), the screw of the electron-positron rotates one time though the distance x_2 is reduced to one third $x_2/3$, which takes only $\Delta t/3$, one third of the former time Δt, necessary for the case of x_2. This means that the gradient of the screw is reduced to one third of the former gradient, which signifies that the length of the slope is unchanged but the advance length Δx_2 is reduced to one third $\Delta x_2/3$. Now the equation of action/reaction becomes:

$$m_1 \frac{\Delta\left(\frac{\Delta x_2/3}{\Delta t/3}\right)}{\Delta t/3} \cdot \frac{\Delta x_1}{\Delta t/3} = -m_2 \frac{\Delta\left(\frac{\Delta x_1}{\Delta t/3}\right)}{\Delta t/3} \cdot \frac{\Delta x_2/3}{\Delta t/3}$$

Thus: $\qquad m_1 \cdot 3\frac{\Delta\left(\frac{\Delta x_2}{\Delta t}\right)}{\Delta t} \cdot 3\frac{\Delta x_1}{\Delta t} = -m_2 \cdot 9\frac{\Delta\left(\frac{\Delta x_1}{\Delta t}\right)}{\Delta t} \cdot \frac{\Delta x_2}{\Delta t} \qquad\qquad \text{(b)}$

Please note that by reducing the distance between the two mass to $1/3$, the acceleration and the force acting on the reactor is now 9 times more, that is the **inverse square** of $1/3$. I will use this result in the next chapter " Newton's and Coulomb's inverse-square law Derived from Newton's Third Law!".

Let us consider another case in which though the distance between the actor and the reactor is not changed, electron-positron pairs mediating them changes its velocity of rotation because of heat, that is, electromagnetic waves, which results in the temperature going up. As the distance x_2 does not change, Δx_2 does not change, and according to Kozyrev's principle of constant velocity of action transmission, Δt will not change. However, because of multiple actions that the electron-positron pairs exerted on the reactor, total rotational length of slope Δx_1 becomes, for instance, three times more
$3 \cdot \Delta x_1$. So, the equation of action/reaction now becomes:

$$m_1 \frac{\Delta\left(\frac{\Delta x_2}{\Delta t}\right)}{\Delta t} \cdot \frac{3 \cdot \Delta x_1}{\Delta t} = -m_2 \frac{\Delta\left(\frac{3 \cdot \Delta x_1}{\Delta t}\right)}{\Delta t} \cdot \frac{\Delta x_2}{\Delta t}$$

Hence, $\quad m_1 \dfrac{\Delta\left(\frac{\Delta x_2}{\Delta t}\right)}{\Delta t} \cdot 3\dfrac{\Delta x_1}{\Delta t} = -m_2 \cdot 3\dfrac{\Delta\left(\frac{\Delta x_1}{\Delta t}\right)}{\Delta t} \cdot \dfrac{\Delta x_2}{\Delta t}$

Thus, because of the heat, the velocity of the particle is now tripled $3\dfrac{\Delta x_1}{\Delta t}$, and the pressure (the

acting force) is now tripled $m_2 \cdot 3\dfrac{\Delta\left(\frac{\Delta x_1}{\Delta t}\right)}{\Delta t}$. This hidden lengthening of spatial length is

compensated by the clockwise-wound positron spiral advancing in the direction opposite to that

of the electron, which results in time delay as $\dfrac{\Delta x_1}{\Delta t_1 / 3}$ in:

$$m_1 \frac{\Delta\left(\frac{\Delta x_2}{\Delta t_2}\right)}{\Delta t} \cdot \frac{\Delta x_1}{\Delta t_1 / 3} = -m_2 \cdot \frac{\Delta\left(\frac{\Delta x_1}{\Delta t_1 / 3}\right)}{\Delta t} \cdot \frac{\Delta x_2}{\Delta t_2}$$

I will use this result in the later chapter "Frontal criticism of the second law of thermodynamics"

Newton's and Coulomb's inverse-square law Derived from Newton's Third Law!

Astonishingly, Newton's and Coulomb's inverse-square law, which are theories of fields, can be demonstrated based on Newton's Third Law of action/reaction, using the model of screw-structured particles along with the principle "One Rotation One Action". And from this theoretical demonstration, we can foresee its huge technological possibilities of application.

  Let us review the equation of Newton's third law:

$$F_1 \cdot v_1 = -F_2 \cdot v_2 \qquad \text{or} \qquad m_1\left(\frac{d^2 x}{dt^2}\right)_1 \cdot \left(\frac{dx}{dt}\right)_1 = -m_2\left(\frac{d^2 x}{dt^2}\right)_2\left(\frac{dx}{dt}\right)_2 \qquad \text{(a)}$$

For a screw, v_1 and v_2 do not mean the velocity of linear motion but signify the Rotational velocity, more precisely, the rotational velocity (not the angular velocity) of a point on the rotating spiral of the screw. And this is the same for the screw of the electron-positron pair of vacuum. Let us suppose that an object charged with positive electricity and an object with negative electricity are located at a distance r first. The positive and negative charges are sending action/reaction to each other. Then, let us think about the case of reducing the distance by half to $r/2$. According to the principle "One Rotation One Action", though the distance is half now, the electron-positron pair of vacuum carrying the action should quickly rotate one time (because of Kozyrev's principle of constant velocity of action transmission, the rotational velocity

of the electron-positron pair is inversely proportional to the distance), that is, at a double rotational velocity v_1', where the "space-distance grain" that is, the circular length (circumference) of the spiral dx, stays the same, because the spiral structure does not change.

$$v_1' = 2 \cdot v_1 \qquad \text{or} \qquad \left(\frac{dx}{dt}\right)' = 2 \cdot \left(\frac{dx}{dt}\right) \qquad \qquad \text{(b)}$$

In order to keep the equality, it is necessary to think that the time grain dt now should have been reduced by half. So, the equation (b) should have been written as:

$$\frac{dx}{dt'} = 2 \cdot \frac{dx}{dt} \qquad \qquad \text{which means} \qquad \qquad dt' = \frac{dt}{2}$$

Thanks to Newton's third law, we can talk about the force or the acceleration with the same space-distance grain dx and the different time grains dt and dt' in time of interaction. Now because of the reduction of the time grain by half, the following relation holds:

$$\left(\frac{d^2 x}{dt^2}\right)' = \frac{d^2 x}{dt'^2} = \frac{d}{dt'}\left(\frac{dx}{dt'}\right) = \frac{d}{dt/2}\left(\frac{dx}{dt/2}\right) = 2^2 \cdot \frac{d}{dt}\left(\frac{dx}{dt}\right) = 2^2 \cdot \frac{d^2 x}{dt^2}$$

Please note that when the distance between the objects is reduced to $1/2$, the force or acceleration is multiplied by 2^2. In general, when the distance now is k times the former, the interacting force is now $1/k^2$ times the former. This signifies that the interacting force, that is, Newton's gravity or Coulomb's force, is inversely proportional to the square of the distance. I mathematically demonstrate this last step. As the acceleration can be a function of the distance, I put:

$$\frac{d^2 x}{dt^2} = F(r)$$

The aforementioned relation can be written as:

$$\frac{1}{k^2} F(r) = \frac{1}{k^2}\frac{d^2 x}{dt^2} = F(kr)$$

I now mathematically demonstrate that if $F(kr) = \frac{1}{k^2}F(r)$, then $F(r) \propto \frac{1}{r^2}$. Now I hypothesize:

$$F(r) \neq \frac{f}{r^2} \qquad \qquad \text{where the inequality signifies that they are not equivalent as a}$$

function, but their graph may cross each other at some points.

$$\frac{1}{k^2} \cdot \frac{f}{r} \neq \frac{1}{k^2} F(r) = F(kr) \neq \frac{f}{(kr)^2} = \frac{1}{k^2} \cdot \frac{f}{r}$$

This signifies that $\frac{1}{k^2} \cdot \frac{f}{r}$ and $\frac{1}{k^2} \cdot \frac{f}{r}$ are not equivalent but different functions but their graph may cross each other only at some points. This is apparently a contradiction. <end of

demonstration>

Sub-structure of Space in terms of Time

Equations of motion in conventional physics is normally stated as:

$$v = v_0 + a_0 t \qquad \text{or} \qquad v = v_0 + a\, t \qquad \text{(a)}$$

$$x = x_0 + v_0 t + \frac{1}{2} a_0 t^2$$

The second equation is obtained by integrating the first by the time t. If the acceleration is time-variant, the first equation should more precisely be written as:

$$v = v_0 + a \cdot t + \frac{1}{2} a' t^2$$

and the second one as: $\qquad x = x_0 + v_0 t + \frac{1}{2} a t^2$

And in general, by multiplying the both hand sides of the second equation with $F = m \cdot a$, and by supposing that the initial velocity v_0 is zero, we get:

$$F \cdot x = ma \cdot x = ma \cdot x_0 + 0 \cdot t + \frac{1}{2} ma^2 t^2$$

In (a), as v_0 is zero, $v = a\, t$. So, the equation of the energy relation can be rewritten as:

$$ma \cdot x - ma \cdot x_0 = \frac{1}{2} mv^2$$

which is the famous "energy conservation law". Thus we have seen that the "energy conservation law" can be derived from the equation of motion itself in conventional physics, if, but be careful, we ignore the term $\frac{1}{2} a' t^2$ of $v = v_0 + a \cdot t + \frac{1}{2} a' t^2$ and probably a possible term $\frac{1}{6} a' t^3$ of

$x = x_0 + v_0 t + \frac{1}{2!} a t^2 + \frac{1}{3!} a' t^3$ and so on. Therefore we can guess that the "energy conservation

law" is only a quite approximate "law" or only an average, that ignores the effect of micro-oscillation of physical time, too. Of course, the failure of energy conservation law is demonstrated by Newton's original third law even at the level of macro-world.

Moreover, this space-structure, even if we add an arbitrary number of subsequent terms of higher degrees, cannot explain that the universal gravitation and the Coulomb force are proportional to the inverse of the square of the space-distance. In fact, this characteristic of proportionality to the inverse of the square of the space-distance should come from the space itself, but not from the nature of mass nor electric charge. So, the inverse proportionality to the square of the space-distance should be embodied into the structure of the space itself.

Just as in my thesis I derived the space-time relation

$$r = x = t^{\frac{2}{3}} \qquad\qquad\qquad (o)$$

which I used for deriving Prof. Anatoly P. Smirnov's equation (31) representing the real phase transition of a many-body problem, I here derive the same space-time relation by formally solving the differential equation of Coulomb force or of universal gravitation:

$$m\frac{d^2 r}{d t^2} = -G\frac{m M}{r^2}$$

$$\frac{d^2 r}{d t^2} = -\frac{G M}{r^2}$$

$$\frac{d r}{d t} = \int \frac{d^2 r}{d t^2}\, d t = -G \cdot \int \frac{M}{r^2}\, d t = -GM \cdot \int \frac{d r}{r^2}\frac{d t}{d r}$$

$$= -GM\frac{1}{(-2+1)\cdot r}\frac{d t}{d r}$$

$$\left(\frac{d r}{d t}\right)^2 = \frac{G M}{r}$$

$$\frac{d r}{d t} = \sqrt{G M}\cdot\frac{1}{\sqrt{r}}$$

$$\int r^{\frac{1}{2}}\, d r = \int \sqrt{r}\, d r = \int \sqrt{GM}\, dt$$

$$\frac{r^{\frac{3}{2}}}{\frac{3}{2}} = \sqrt{GM}\, t$$

$$r^{\frac{3}{2}} = 2^{\frac{1}{2}}\frac{3}{2}\sqrt{GM}\, t, \qquad t = \frac{\sqrt{2}\, r^{\frac{3}{2}}}{3\sqrt{GM}}$$

$$r = 2^{\frac{1}{3}}\left(\frac{3}{2}\right)^{\frac{2}{3}}(GM)^{\frac{1}{3}}\cdot t^{\frac{2}{3}} \qquad (a), \qquad \frac{1}{t^{\frac{4}{3}}} = 2^{\frac{2}{3}}\left(\frac{3}{2}\right)^{\frac{4}{3}}(GM)^{\frac{2}{3}}\cdot\frac{1}{r^2}$$

$$\frac{d r}{d t} = 2^{\frac{1}{3}}\frac{2}{3}\left(\frac{3}{2}\right)^{\frac{2}{3}}(GM)^{\frac{1}{3}}\cdot\frac{1}{t^{\frac{1}{3}}} \qquad (b)$$

$$\frac{d^2 r}{d t^2} = 2^{\frac{1}{3}}\frac{2}{3}\left(-\frac{1}{3}\right)\left(\frac{3}{2}\right)^{\frac{2}{3}}(GM)^{\frac{1}{3}}\cdot\frac{1}{t^{\frac{4}{3}}} = 2^{\frac{1}{3}+\frac{2}{3}}\cdot\frac{2}{3}\left(-\frac{1}{3}\right)\left(\frac{3}{2}\right)^{\frac{2}{3}+\frac{4}{3}}(GM)^{\frac{1}{3}+\frac{2}{3}}\cdot\frac{1}{r^2} \qquad (c)$$

$$\therefore \quad \frac{d^2 r}{d t^2} = -\frac{G M}{r^2}$$

We can understand from the equation (a) that in the space of action/reaction like gravity or Coulomb force, space distance x is proportional to $t^{\frac{2}{3}}$.

This solution of space-time relation is still confirmed by the following surprisingly conforming fact:

$$x = x_0 + v_0 t + \frac{1}{2!} a_0 t^2 + \frac{1}{3!} a_0' t^3 + \cdots \qquad (d)$$

As in the aforementioned derivation, the velocity v_0 has the time dimension $t^{-\frac{1}{3}}$ obtained by differentiating both sides of the equation (a) by t, $v_0 t$ has the time dimension $t^{\frac{2}{3}}$ (because $t^{-\frac{1}{3}} \cdot t = t^{\frac{2}{3}}$), which is exactly the time dimension of space distance I showed in equation (a). As the acceleration a_0 has the time dimension $t^{-\frac{4}{3}}$, $\frac{1}{2!} a_0 t^2$ has the time dimension $t^{\frac{2}{3}}$, which is exactly the time dimension of space distance. As the time derivative of acceleration a_0' has the time dimension $t^{-\frac{7}{3}}$, $\frac{1}{3!} a_0' t^3$ has the time dimension $t^{\frac{2}{3}}$, which is exactly the time dimension of space distance, etc. So we understand that in the action/reaction space, space distance and the time are mutually dependent. The time t I talk about here should be the internal physical action/reaction time (I will explain later why I call it "internal"), because it concerns the action/reaction like Coulomb force and universal gravitational force. So, From here on, I call this internal action/reaction time t'.

However, we should be aware that in the above equation of motion (d) in order to give some value to x, seemingly we can freely set v_0, a_0, a_0', etc. all independently. The reason should be that because of the motion, the physical time is decelerated. To what extent is it decelerated? In order to answer this question, let us find out the space-physical time relation that assures time independence on the right-hand side of the equation (d).

If only we set: $\qquad r = x = \ln(t+1) \qquad (e)$

(the reason why I add one to the physical time is related to the fact that in the chapter "Physical time oscillation explains Compton scattering, inside classical physics" of my thesis, I put $2t$ in

$$t' = 2t - \frac{\hbar}{\pi mc^2} \sin(\frac{2\pi mc^2}{\hbar} t)$$

instead of t, and by doing so, I succeeded in exactly deriving the equation of Compton scattering), we succeed in assuring time independence of each term of the right-hand side of the equation (d): such as $v(t+1) = \frac{dx}{d(t+1)}(t+1) = \frac{d\ln(t+1)}{d(t+1)}(t+1) = \frac{t+1}{t+1} = 1$, which is constant that does not include time. The same is true for

$$a(t+1)^2 = \frac{d^2 x}{d(t+1)^2}(t+1)^2 = \frac{d^2 \ln(t+1)}{d(t+1)^2}(t+1) = -\frac{(t+1)^2}{(t+1)^2} = -1$$

and: $\quad a'(t+1)^3 = \frac{d^3 x}{d(t+1)^3}(t+1)^3 = \frac{d^3 \ln(t+1)}{d(t+1)^3}(t+1)^3 = \frac{2(t+1)^3}{(t+1)^3} = 2$, and so on.

Please note that for both equation (o) $r = x = t'^{\frac{2}{3}}$ and (e) $r = x = \ln(t+1)$, $x = 0$ when $t' = 0$ and $t = 0$.

Derivation of Ratio of Time-Delay from Non-Integer Dimension of Time-Space

Now let us calculate to what extent the internal physical action/reaction time t' is delayed compared with the time t for the motion equation. I represent the delay in terms of the physical velocity of motion:

$$v = \frac{dx}{dt} = \frac{1}{t+1} \qquad \text{(f)}, \qquad t+1 = \frac{1}{v}$$

Surprisingly, this approach enables us to derive the same relative ratio of time delay:

$\dfrac{1}{\sqrt{1 - \dfrac{v^2}{c^2}}}$ that Einstein derived. I derive it below.

From the equations (o) and (e),

$$t'^{\frac{2}{3}} = \ln(t+1) \qquad \text{(g)}, \qquad \frac{1}{t'^{\frac{1}{3}}} = \frac{1}{\sqrt{\ln(t+1)}}$$

We differentiate the both sides of the equation (g) by the physical time t'.

$$\frac{2}{3}\frac{1}{t'^{\frac{1}{3}}} = \frac{1}{t+1}\frac{dt}{dt'}$$

$$\frac{dt}{dt'} = \frac{2}{3}\frac{t+1}{\sqrt{\ln(t+1)}} = \frac{2}{3}\frac{1/v}{\sqrt{\ln(1/v)}} \qquad \text{(h)}$$

Let us reason around $v \cong 1$, which signifies $v \cong c$; that is, v in (h) is to be represented later as v/c. If we put $\frac{1}{v} = y$, then:

$$f(y) = \ln y = \ln\frac{1}{v} = \frac{f(1)}{0!}(y-1)^0 + \frac{f'(1)}{1!}(y-1)^1 + \frac{f''(1)}{2!}(y-1)^2 + \cdots$$

$$\cong 0 + \frac{1}{1!}(y-1) + \frac{-1}{2!}(y-1)^2$$

$$= \left(\frac{1}{v} - 1\right) - \frac{1}{2}\left(\frac{1}{v} - 1\right)^2$$

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$$= \frac{1}{v} - 1 - \frac{1}{2}\frac{1}{v^2} + \frac{1}{v} - \frac{1}{2}$$

$$= -\frac{1}{2}\frac{1}{v^2} + \frac{2}{v} - \frac{3}{2} \qquad\qquad \text{(i)}$$

By introducing this relation (i) into (h), we get:

$$\frac{dt}{dt'} = \frac{2}{3} \cdot \frac{1}{v \cdot \sqrt{-\frac{1}{2}\frac{1}{v^2} + \frac{2}{v} - \frac{3}{2}}} = \frac{2}{3} \cdot \frac{1}{\sqrt{-\frac{1}{2} + 2v - \frac{3}{2}v^2}} \qquad\qquad \text{(j)}$$

Now let us look at the following relation. As we supposed here $v \cong 1$:

$$(v-1)^2 \cong 0$$

$$v^2 - 2v + 1 \cong 0$$

$$\left(\frac{3}{2} - \frac{1}{2}\right)v^2 - 2v + \left(\frac{1}{2} + \frac{1}{2}\right) \cong 0$$

$$-\left(\frac{3}{2} - \frac{1}{2}\right)v^2 + 2v - \left(\frac{1}{2} + \frac{1}{2}\right) \cong 0$$

$$-\frac{1}{2} + 2v - \frac{3}{2}v^2 \cong \frac{1}{2} - \frac{1}{2}v^2 \qquad\qquad \text{(k)}$$

By introducing (k) into (j), we get:

$$\frac{dt}{dt'} \cong \frac{2}{3}\frac{1}{\sqrt{\frac{1}{2} - \frac{1}{2}v^2}} = \frac{2\sqrt{2}}{3}\frac{1}{\sqrt{1-v^2}} = \frac{2.8284...}{3}\frac{1}{\sqrt{1-v^2}} \cong \frac{1}{\sqrt{1-v^2}} = \frac{1}{\sqrt{1-\frac{v^2}{c^2}}}$$

This is exactly the same ratio of time delay in terms of velocity as the one Einstein derived. But please note that this derivation is based only on Newton's universal gravitation and the motion equation, and is not based on Minkowski's 4 dimensional space-time that Einstein introduced ad hoc.

Please note that the equation (a) that shows the <u>action/reaction space distance x is proportional to $t^{\frac{2}{3}}$</u> but not to t. This, I say the conclusion first, signifies that the ether exists, in other words, that there should be a mediator chain that connects all the way between the actor and the reactor and that is maintained during all the time the action/reaction are being exchanged. The fact that the space distance x is proportional to $t^{\frac{2}{3}}$ but not to t signifies that the entire chain of electron-positron pairs of vacuum connecting between the actor and the reactor, i.e., the entire historical process time in the past is shortening and lengthening as the

time goes by (The time delay is not generated only locally just at the moment the time passes by, but is generated in the entire chain of electron-positron pairs, going back the time up to the very moment the action is emitted.). If the space distance were proportional to t, time delay and advance can be done locally and are not accumulated.

Why Action is More Fundamental Than Energy

 I explain in this chapter why the law of "energy conservation" is not necessarily respected, but the law of "action conservation (of opposite signs)" is right. Let us compare the time-space relation in the last chapter $r = 2^{\frac{1}{3}}\left(\frac{3}{2}\right)^{\frac{2}{3}}(GM)^{\frac{1}{3}}\cdot t^{\frac{2}{3}}$ and the Prof. Kozyrev's time-space relation

$\frac{\delta x}{\delta t} = \alpha c$ or $x = \alpha c \cdot t$ that I used from the beginning of this dissertation. αc Being the

velocity times two pi of the solar system against the static ether, Prof. Kozyrev's time-space relation gave us a very reasonable and clear geometrical image. Both the time in $x = \alpha c \cdot t$ and

the time in $r = 2^{\frac{1}{3}}\left(\frac{3}{2}\right)^{\frac{2}{3}}(GM)^{\frac{1}{3}}\cdot t^{\frac{2}{3}}$ are related to action/reaction. We can say that the time of the

latter is an "inner physical action/reaction time", while the former is the discrete time difference of action/reaction time measured at the moment of emission of the action and at the moment of the reactor receiving the action. So, in order to calculate the velocity and the acceleration, let us

differentiate the distance $x = r$ not by t like $\frac{dx}{dt}$ but by $t^{\frac{2}{3}}$ like $\frac{dx}{dt^{\frac{2}{3}}}$. If we put $t^{\frac{2}{3}} = T$ or

$t = T^{\frac{3}{2}}$, the "velocity" is given by:

$$v = \frac{dx}{dt^{\frac{2}{3}}} = \frac{d}{dt^{\frac{2}{3}}}(\alpha c \cdot t) = \alpha c \cdot \frac{dT^{\frac{3}{2}}}{dT} = \frac{3}{2}\alpha c \cdot T^{\frac{1}{2}} = \frac{3}{2}\alpha c \cdot (t^{\frac{2}{3}})^{\frac{1}{2}} = \frac{3}{2}\alpha c \cdot t^{\frac{1}{3}} \quad \text{(a)}$$

And the "acceleration" is given by:

$$a = \frac{d^2 x}{d(t^{\frac{2}{3}})^2} = \frac{d}{d(t^{\frac{2}{3}})}\left(\frac{3}{2}\alpha c \cdot t^{\frac{1}{3}}\right) = \frac{3}{2}\alpha c \cdot \frac{d}{dT}T^{\frac{1}{2}} = \frac{3}{2}\frac{1}{2}\alpha c \cdot \frac{1}{T^{\frac{1}{2}}} = \frac{3}{4}\alpha c \cdot \frac{1}{t^{\frac{1}{3}}} \quad \text{(b)}$$

As the force is defined as $\quad F = m \cdot a$, the action can be calculated as:

$$F \cdot v = ma \cdot v = m \cdot \left(\frac{3}{4}\alpha c \cdot \frac{1}{t^{\frac{1}{3}}}\right) \cdot \left(\frac{3}{2}\alpha c \cdot t^{\frac{1}{3}}\right) = \frac{9}{8}m\alpha^2 c^2 = \frac{9}{8}\alpha^2 \cdot mc^2 \qquad \text{(c)}$$

What is very important here is that the time variable disappears from the right-hand side of the

action because the $t^{\frac{1}{3}}$ in the numerator and in the denominator cancel each other and the

quantity of the action does not change as time goes by during the action/reaction process, which

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is the main reason why the action is far more fundamental than energy, because in case of energy, time in the numerator and time in the denominator do not cancel each other, so the energy may change if calculated for a period of time not corresponding to the period of time starting at the moment the action begins and ending at the moment the action ends.

$$F \cdot x = ma \cdot x = m \cdot \left(\frac{3}{4} \alpha c \cdot \frac{1}{t^{\frac{1}{3}}} \right) \cdot \alpha c t = \frac{3}{4} \alpha^2 mc^2 \cdot t^{\frac{2}{3}} \qquad (d)$$

And moreover as $F \cdot v$ in the above equation (c) represents one action which takes place for the "unit time" (one "rotation" in the screw model of "one action one rotation"), that is, time duration necessary for the unit action, the right-hand side gets the dimension of energy, which, in fact, is the square of the fine structure constant times the famous mc^2. Thus, though the dimension of the right-hand side of the equation (c) is energy and the left-hand side of the equation (c) is action, this seems to be what is happening inside the action/reaction. The key point here is to know how the "inner time" of action/reaction is connected to the "outer time" of the action/reaction.

In the process of action/reaction, the mass of the actor m_2 determines the quantity of action:

$$\frac{9}{8} \alpha^2 \cdot m_2 c^2$$

which is transferred to the reactor with mass m_1, who determines the force F_1 to receive from its current velocity v_1, according to the calculation:

$$\frac{9}{8} \alpha^2 \cdot m_2 c^2 = F_1 \cdot v_1$$

Also Plank constant as "action" has no time dimension

Let us review the uncertainty principles from the point of view of time dimension. Before doing it, let us remember that:

$$x = b \cdot t^{\frac{2}{3}}, \quad v = \frac{2}{3} b \cdot t^{-\frac{1}{3}}, \quad a = -\frac{1}{3}\frac{2}{3} b \cdot t^{-\frac{4}{3}}, \text{ and } \quad M = d \cdot t^{-\frac{1}{3}}$$

One of the uncertainty principle is: $\quad \Delta p \cdot \Delta x = \hbar$.

So, $\quad (mv) \cdot x = (k t^{-\frac{1}{3}} \cdot \frac{2}{3} b t^{-\frac{1}{3}}) \cdot b t^{\frac{2}{3}} = (\frac{2}{3} k b) \cdot t^0$

The other uncertainty principle is: $\quad \Delta E \cdot \Delta t = \hbar$

So, $\quad (ma\,x) \cdot t = \{(k t^{-\frac{1}{3}})(-\frac{1}{3}\frac{2}{3} b t^{-\frac{4}{3}})(b t^{\frac{2}{3}})\} \cdot t = (-\frac{1}{3}\frac{2}{3} k b^2) \cdot t^0$

This demonstrates why Plank constant is a real constant in time of action/reaction. Comparison of this with the Newtonian action/reaction in the preceding chapter explains the gap of the square of the time dimension between the Newtonian action and Plank "action". In the Newtonian action, mass is considered to be time-independent, which is also reasonable, because the winding number

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per length of the mass spiral will not change even in time of action/reaction. In Plank "action", mass is considered to be time dependent.

Action Conservation Geometrically Explained by Non-Integer Dimension of Time

By solving the differential equation of Newton's universal gravitation, I obtained the relation

$r = 2^{\frac{1}{3}}\left(\frac{3}{2}\right)^{\frac{2}{3}}(GM)^{\frac{1}{3}} \cdot t^{\frac{2}{3}}$ which can be rewritten as:

$$r^3 = \frac{9}{2} GM \cdot t^2$$

which can further be rewritten in the following vectorial equation including outer products and an inner product:

$$\vec{r_1} \cdot (\vec{r_2} \times \vec{r_3}) = \frac{9}{2} GM \| \vec{t_1} \times \vec{t_2} \| \quad \text{where } |\vec{r_1}| = |\vec{r_2}| = |\vec{r_3}| = r, \ |\vec{t_1}| = |\vec{t_2}| = t$$

As I showed in the preceding chapter, an action has its time canceled, which enables us to take as constant length the vector of action and to take as variable an edge t of the square spanned by the outer product $\vec{t_1} \times \vec{t_2}$. It is now made possible to quantitatively treat actions that traverse the surface spanned by the outer product $\vec{t_1} \times \vec{t_2}$ and come into the three dimensional space spanned by:

$$\vec{r_1} \cdot (\vec{r_2} \times \vec{r_3})$$
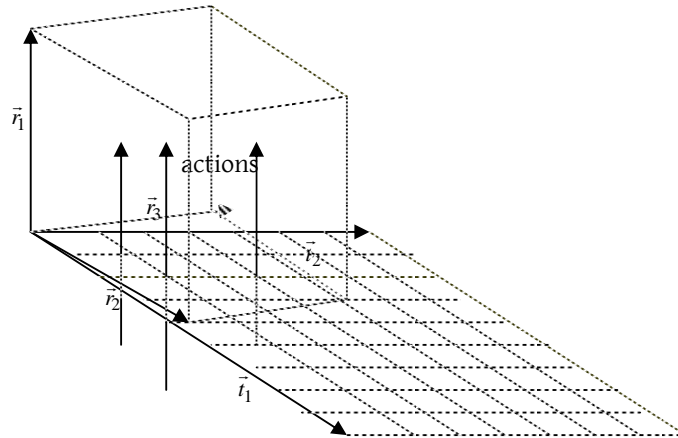
As an action stays constant with regards to time variable while the action is taking place, the traversed surface of the square spanned by the outer product $\vec{t_1} \times \vec{t_2}$ (please note that this square has the time dimension $[time]^2$) can be of any size and its edge can adequately be set to have the length of time corresponding to one action. This geometrical structure justifies that we call both Newton's $F \cdot v$ and Plank constant $\hbar$ obtainable by multiplying $F \cdot v$ with the traversed surface $\| \vec{t_1} \times \vec{t_2} \|$ "actions", in spite of the difference of the time dimension $[time]^2$. This

structure explains also why the physical entity having the middle difference of time dimension [*time*], i.e., energy, cannot be an action and is not conserved in time of action/reaction.

If the three dimensional space volume $\vec{r_1} \cdot (\vec{r_2} \times \vec{r_3})$ shrinks compared with the time $\|\vec{t_1}\|$ on the side of the reactor, this signifies that the velocity $\dfrac{\|\vec{r_1}\|}{\|\vec{t_1}\|}$ of the reactor decreases, which, according to Newton's original third law, brings about a concentration of the action in the shrunk volume of three dimensional space, which is in conformity with this vectorial time-space mechanism, saying that then $\|\vec{r_2} \times \vec{r_3}\|$ decreases, that is, the force (= energy concentration in a distance) inversely proportional to it $F \propto \dfrac{1}{\|\vec{r_2} \times \vec{r_3}\|}$ increases, thus also concentrating the actions inside the shrunk volume. This is exactly an **anti-entropy** process.

Change of Relative Mass at a Constant Velocity Explained Using Action/Reaction

Einstein explained the change of relative mass at a constant velocity by equaling the momentum of the invariant mass and that of the relative mass ad hoc, using his ratio of his Minkowski's space-time distance ds and the customary definition of time dt. I do not use that equality, because "the momentum conservation law" is not necessarily true.

I here use Newton's third law of action/reaction with my model of the vacuum of screw-structured electron-positron pairs. Though an object is moving at a constant velocity from outer point of view, the object does not recognize it as a constant velocity based on the inner physical action/reaction time $t'^{\frac{2}{3}}$. The inner physical action/reaction time t' advances slower than the outer time t of motion, because $x = k \cdot t'^{\frac{2}{3}}$ and

$x = k \cdot \ln(t + 1)$. The object <u>leaves behind an action addressed to itself in the future</u> because of this difference of time speed. So, supposing that the left-hand side represents the action of the object whose mass, based on its inner physical time, is the "invariant mass" m, whereas the right-hand side represents the reaction returned by the object itself in the future who recognizes its mass as the "relative mass" M based on its outer time of motion. Newton's equation of action/reaction can be written as:

$$F_1 \cdot \frac{dx}{dt'} = -F_2 \cdot \frac{dx}{dt} \qquad \text{(a)}$$

Please note that mass is always recognized as the force necessary to move it. So $m \propto F_1$ and $M \propto -F_2$. Therefore, if we suppose that the space where the actor and the reactor are interacting is common to each other, from the equation (a) we can derive:

$$M = m \cdot \frac{dt}{dt'}$$

And using the time-delay relation I derived in the preceding chapter "Derivation of Quantity of Time-Delay from Non-Integer Dimension of Time-Space":

$$\frac{dt}{dt'} = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}}$$

we conclude:
$$M = \frac{m}{\sqrt{1 - \frac{v^2}{c^2}}}$$

Demonstration of Kozyrev's Equation of Action-Transfer Velocity

From the beginning of this dissertation, I used Kozyrev's equation of action-transfer velocity:

$$\frac{\delta x}{\delta t} = \alpha c \qquad\qquad\qquad (a)$$

I here demonstrate why this is <u>right for the discrete period of time of one action measured between the moment of action emission by the actor and the moment of action reception by the reactor</u>, based on the same approach that I used when I derived the solution of non-integer space-time dimension from the equation of Newton's universal gravitation, where the equation is seen as a differential equation of the space-distance considered as a function of time. Instead of the gravity by the earth:

$$\frac{dr}{dt} = 2^{\frac{1}{3}} \frac{2}{3} \left(\frac{3}{2} \right)^{\frac{2}{3}} (GM)^{\frac{1}{3}} \cdot \frac{1}{t^{\frac{1}{3}}}$$

I here use Coulomb force of an electron acting upon another electron, and get:

$$\frac{dr}{dt} = \frac{2}{3} 2^{\frac{1}{3}} \left(\frac{3}{2} \right)^{\frac{2}{3}} \left\{ \frac{(e^-)^2}{4\pi \varepsilon_0 m_e} \right\}^{\frac{1}{3}} \cdot \frac{1}{t^{\frac{1}{3}}} \qquad\qquad (b)$$

As Kozyrev's equation of action transfer velocity is for One Action, I here use the one period of time of the physical time oscillation, that is, $t = \frac{\hbar}{m_e (\alpha c)^2}$ from the moment of action emission up to the moment of the reactor's receiving the action. As Kozyrev's equation of action transfer velocity is for One Action, what time-curve the space-distance will have does not matter. As the fine structure constant is defined as: $\alpha = \frac{e^2}{4\pi \varepsilon_0 \hbar c}$, the equation (b) is transformed into:

$$\left(\frac{dr}{dt}\right)_{at\ the\ end\ of\ one\ action} = \frac{2}{3} 2^{\frac{1}{3}} \left(\frac{3}{2}\right)^{\frac{2}{3}} \left\{\frac{(e^-)^2}{4\pi\varepsilon_0 m_e}\right\}^{\frac{1}{3}} \cdot \left\{\frac{m_e(\alpha c)^2}{\hbar}\right\}^{\frac{1}{3}}$$

$$= \frac{2}{3} 2^{\frac{1}{3}} \left(\frac{3}{2}\right)^{\frac{2}{3}} \left\{\frac{e^2}{4\pi\varepsilon_0}\left(\frac{e^2}{4\pi\varepsilon_0}\right)^2 \frac{c^2}{\hbar^2 c^2 \hbar}\right\}^{\frac{1}{3}}$$

$$= \frac{2}{3} 2^{\frac{1}{3}} \left(\frac{3}{2}\right)^{\frac{2}{3}} \frac{e^2}{4\pi\varepsilon_0 \hbar}$$

$$= \frac{2}{3} 2^{\frac{1}{3}} \left(\frac{3}{2}\right)^{\frac{2}{3}} \alpha c$$

$$= 1.1005 \cdot \alpha c$$

$$\cong \alpha c$$

Thus Kozyrev's equation (a): $\dfrac{\delta x}{\delta t} = \alpha c$ is demonstrated.

Time Speed Difference of Back and Forth Spatial Direction between Different Mass

  Now let us analyze a very curious fact, which surprisingly we can infer from Newton's equation of universal gravitation.

$$m \cdot \frac{d^2 r}{dt^2} = -G \cdot \frac{m M}{r^2} = M \cdot \frac{d^2 r}{dt^2}$$

Let us suppose m is the mass of the earth and M is the mass of the sun which is far bigger than the former: $m \neq M$. If we suppose that the differentiated space-distance is the same except the direction, we apparently find the above equation strange, because if we cancel $\dfrac{d^2 r}{dt^2}$ of the left end and that of the right end, we cannot but say $m = M$. This is exactly contrary to what we have just supposed.

  So, let us treat this question more precisely, by transformation of the space coordinate $x' = -x + r$ but Not taking into account the question of Time on purpose, where I introduce a space coordinate $x'(t)$, function of the common time t , for the object of the mass $M(t)$ which is also a function of the time t , and a space coordinate $x(t)$, function of the common time t , for the object of the mass $m(t)$ which is also a function of the time t , and r is the initial distance (here considered constant) between the two objects:

$$m(t)\frac{d^2 x(t)}{dt^2} = -M(t)\frac{d^2 x'(t)}{dt^2}$$

$$m(t)\frac{d^2 x(t)}{dt^2} = -M(t)\frac{d^2 \{-x(t) + r\}}{dt^2}$$

As r is constant, the right-hand side can ignore the term r:

$$m(t)\frac{d^2\,x(t)}{d\,t^2} = -M(t)\frac{d^2\,\{-x(t)\}}{d\,t^2} = M(t)\frac{d^2\,x(t)}{d\,t^2}$$

So the same problem subsists. If we cancel $\dfrac{d^2\,x(t)}{d\,t^2}$ because that is a differentiation with regard to

the same space coordinate $x(t)$ by the same Time t, we get again the contradiction:

$$m(t) = M(t)$$

<u>There is no other solution than to interpret that the time grain is different for m and M.</u> I

rewrite the equation as:

$$m \cdot \frac{d^2\,r}{d\,t_m^2} = M \cdot \frac{d^2\,r}{d\,t_M^2}$$

Let us integrate the both sides by t_M:

$$m \cdot \left(\int \frac{d^2\,r}{d\,t_m^2}\,d\,t_m \right) \cdot \frac{d\,t_M}{d\,t_m} = M \cdot \int \frac{d^2\,r}{d\,t_M^2}\,d\,t_M$$

$$m \cdot \frac{d\,r}{d\,t_m}\frac{d\,t_M}{d\,t_m} = M \cdot \frac{d\,r}{d\,t_M}$$

$$\frac{m}{M} = \left(\frac{d\,t_m}{d\,t_M}\right)^2 \qquad \text{or} \qquad \sqrt{\frac{m}{M}} = \frac{d\,t_m}{d\,t_M}$$

In general: $\qquad \sqrt{m} \propto d\,t_m$

This explains more precisely the time-delay and time-advance under the influence of gravitational

potential energy I demonstrated in the chapter "Red Shift and Time Delay", in supposition that the

electron-positron pair getting some mass when on a trajectory of light, falls down under gravity.

The mass of the electron of an electron-positron pair on a trajectory of light (= so-called "photon")

is non-zero and would be derived as follows:

$$\hbar \nu_1 = \int F \cdot v\,d\,t = \int m_{e^-e^+}\frac{d^2\,x}{d\,t^2} \cdot \frac{d\,x}{d\,t}\,d\,t \quad \text{where } \nu_1 \text{ signifies one frequency per unit time.}$$

As: $\qquad \int \frac{d^2\,x}{d\,t^2}\frac{d\,x}{d\,t}dt = \frac{d\,x}{d\,t}\int\frac{d^2\,x}{d\,t^2}dt - \int\frac{d^2\,x}{d\,t^2}\frac{d\,x}{d\,t}dt$,

$$2 \cdot \int \frac{d^2\,x}{d\,t^2}\frac{d\,x}{d\,t}dt = \left(\frac{d\,x}{d\,t}\right)^2 = c^2$$

Hence, $\quad \hbar \nu_1 = \frac{1}{2}m_{e^-e^+}\left(\frac{d\,x}{d\,t}\right)^2 = \frac{1}{2}m_{e^-e^+}\,c^2$. $\qquad$ I omit ν_1 from now on.

Thus, $\quad m_{e^-e^+} = \frac{2\hbar}{c^2}$. $\qquad$ But please be aware that there are cases in which only the electron of

the electron-positron pair acts. In those cases, only the mass of the electron of an

electron-positron pair counts: $m_{e^- e^+} = \dfrac{\hbar}{c^2}$. I will use this result later when I revisit

Compton scattering. The momentum, kinetic energy of the electron-positron pair of the vacuum

are: $\dfrac{\hbar}{c^2} c = \dfrac{\hbar}{c}$, $\dfrac{1}{2} \dfrac{2\hbar}{c^2} c^2 = \hbar$ respectively.

Let us suppose that light is emitted from the earth to an artificial satellite and then the light of the same frequency is emitted from the satellite to the earth. As the inner time grain for the earth of far bigger mass should be bigger, the frequency of light going up from the earth toward the satellite will decrease (red shift), whereas the frequency of light coming from the satellite down to the earth will increase. This is the same result as the one I derived in the chapter "Red Shift and Time Delay". This will explain also that the color of the light coming from the moon, though it is the same light of the sun including much of red light that is reflected by the moon, is usually "pale" (unless the condition of the air is unusual).

Time-Delay and Red Shift Occurs If Only the Distance is Large

Let us review the equation of inner physical action/reaction time:

$$\frac{dr}{dt'} = \frac{k_1}{t'^{\frac{1}{3}}} = \frac{k_2}{r^{\frac{1}{2}}} \qquad \text{(a)} \qquad \text{because} \quad r^{\frac{3}{2}} \propto t'$$

If we suppose that the light velocity is the same all over the universe, it is reasonable to put:

$$dr = \Delta r = c$$

So, in general, we can say:

$$r^{\frac{1}{2}} \propto dt'$$

As the farthest corner of the universe is very far away, the r on the right-hand sidethe equation (a) should be extremely large, so the right-hand side should be very small. In order to maintain the equality, the time grain dt' at the end of the universe should be very large, which causes the extreme decrease of frequency, that is, red-shift of light emitted by the stars near the end of the universe.

Please remember that **for the stars at the extreme far-end of the universe to red-shift, no Doppler-effect is necessary**. **Only the extreme far distance is sufficient.** It is wrong for the conventional physics to believe that the stars at the end of the universe is recessing at a velocity now approaching the velocity of light, which, according to them, causes the red-shift under Doppler effect. In fact, this idea of conventional physicists' was brought about when Hubble announced that the velocity of a star is almost proportional to its distance: $v = H_0 r$. Up to the end of his life, Hubble himself doubted that this velocity bringing about Doppler effect is the cause of the red-shift of stars at the end of the universe. As I demonstrated above, Hubble's doubt was

right.

Conventional physicists commit two fundamental mistakes in recognizing Hubble's report:

1) Hubble's $v = H_0 r$ is not something special at all. Anybody else would have reported so, because if we can abstract that the universe is mostly in uniform circular motion at an angular velocity , we can say $v = \omega r$. The motion is not necessarily in the outward direction at all. That is the reason why Hubble himself doubted Doppler effect.

2) As the conventional physicists insist that nothing will be sent faster than the velocity of light, what would happen after the stars at the end of the universe "attains" the velocity of light?!

Conventional physicists commit two more fundamental mistakes in interpreting Hubble's report:

3) They forced themselves to believe that the velocity of red-shifting stars at the end of the universe is in the outward direction which should cause Doppler effect. They have never seriously analyzed Newton's equation of universal gravitation, which, if done, would have revealed that the mere distance will cause red-shift.

4) They even inferred that that red-shift is a very basic evidence of their "big-bang theory". As the stars can be interpreted as moving outward (at an accelerated speed! according to Hubble's equation!), long long time ago the universe would have originated from one-point concentration which then exploded. But why, then, are they accelerated?! What kind of action is accelerating them?! According to them, no ether is outside the end of the universe. How can the stars go out?! For their convenience, they denied the existence of the ether. For the wave of action/reaction to propagate, for them, no media are necessary.

5) Isn't the "big-bang theory" an inevitable result of the second law of thermodynamics, that is, the monotonous entropy increase?! They talk only of "dissipative movements". But there should be also stars coming into the visible limit of the universe. They intentionally ignore them.

6) Conventional physicists pretend that the "cosmic background radiation" is an important evidence of their "big-bang theory", saying that it is the aftereffect of the "big-banging" at the beginning of the universe. Absolutely not! "Big-bang theory" is a fake. The cosmic background radiation comes uniformly from all directions, even from the space no stars are visible. The radiation is coming from a static coordinates fixed at the space of the universe. Moreover, the radiation is a wide spectral band. According to what I derived, simply the great distance will cause red-shift inside the maximally visible distance, and beyond that distance, most of the stars are invisible (because how can a man-made device catch an electromagnetic wave whose frequency is once a year?) but stars of all sorts emitting light of extremely high frequency will come in through that distance limit of visibility, just like "black-body radiation". The seeming "black-body radiation" is an extreme of "red-shift" caused by the still greater distance. That is

the origin of the background radiation. In fact, outside the maximal distance limit of visibility, there should be innumerable stars. It would be difficult to know the end of the universe.

Gravitational-Lens Effect

Einstein explained "the gravitational-lens effect", based on the Eikonal approximation in optics, introducing into it his "time delay" under gravitational potential, and refraction index resulting from it, under the hypothesis that "photon" is something special that has no mass. The equation he derived was:

$$\Delta \alpha = -4 \frac{G M(b)}{c^2 b} \quad \text{(a)}$$

where $\Delta \alpha$ is the angle of refraction, and b is as shown below.

Here I demonstrate that with a "photon", that is, an electron-positron pair on the trajectory of light, having mass $(\hbar \nu_1)/c^2$ and obeying the same gravitational law as any other object that has mass, we can perfectly derive the equation of gravitational-lens effect, where we consider the "photon" as an object moving at the velocity c that falls down under gravity. The equation of Newton's universal gravitation already implicitly takes into account time delay/advance as I showed in my thesis ($m_1 \frac{d^2 x}{d t_1^2} = -m_2 \frac{d^2 x}{d t_2^2}$). The trajectory of a falling object under gravity does not depend on the size of mass, of course.

First, let us consider the scene in which from the left side a "photon" is approaching the point S at the distance b from the center of gravity L. The angle of refraction α can be calculated as a ratio of the vertical y component versus the horizontal x component of the velocity of the falling "photon", where x component is the constant velocity of light c, and the y component is what we derive below.
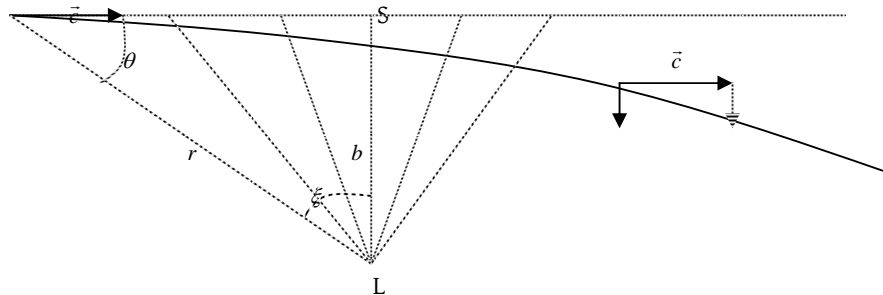
In this case, the gravitational acceleration can be defined as:

$$\frac{G M}{r^2} \cdot \sin \theta$$

where the distance r is a function of the time t, and approximately $\sin \theta \cong b/r$ holds. Mass   is located at .

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So, if we integrate this acceleration by time, we get the y component of the velocity. Here we suppose an equation: $c^2 t^2 + b^2 = r^2$, and the time proceeds from negative time point value to zero, when the "photon" arrives at the point S. The vertical velocity is:

$$\int \frac{GM}{r^2} \sin\theta \, dt \cong \int \frac{GMb}{r^2} \frac{b}{r} \, dt = GMb \int \frac{1}{r^3} dt = GMb \int \frac{1}{r^2} \frac{dr}{c^2 t} \quad \text{where} \quad \frac{dr}{dt} = \frac{c^2 t}{r} \quad \text{is used.}$$

$$= \frac{GMb}{c} \int \frac{dr}{r^2 \sqrt{r^2 - b^2}} = \frac{GMb}{c} \int \frac{dR}{(R^2 + b^2)^{\frac{3}{2}}} \quad \text{where} \quad \sqrt{r^2 - b^2} = R \quad \text{and} \quad \frac{r \, dr}{\sqrt{r^2 - b^2}} = dR$$

Then, by putting $R = b \cdot \tan\xi$

$$= \frac{GMb}{c} \int \frac{1}{\dfrac{b^3}{\cos^3 \xi}} \frac{b}{\cos^2 \xi} \, d\xi = \frac{GMb}{c} \int \frac{\cos\xi}{b^2} \, d\xi$$

If we integrate from   to , we get,

$$= \frac{GMb}{c} \int_{90°}^{0°} \frac{\cos\xi}{b^2} = -\frac{GM}{cb}$$

For the interval where the "photon" proceeds from the point S to the rightward, that is, the time proceeds from zero to positive infinite value, the falling acceleration is almost symmetric. So, the vertical velocity is still increased by:

$$\int \frac{GM}{r^2} \sin\theta \, dt = \frac{GMb}{c} \int_{0°}^{-90°} \frac{\cos\xi}{b^2} = -\frac{GM}{cb}$$

So, the total vertical velocity of the "photon" after passing through the gravity is:

$$-2\frac{GM}{cb}$$

The angle of refraction is calculated as the ratio of vertical velocity versus the horizontal velocity:

$$-2\frac{GM}{c^2 b} \qquad\qquad \text{(b)}$$

If we compare (b) with the right-hand side of Einstein's equation (a), (b) is one half of the latter. The reason is that Einstein hypothesized that instead of point mass located at L, mass is spherically symmetrically distributed from L to S under gravity. As a consequence, the center of gravity for Einstein is at the distance $b/\sqrt{2}$ instead of b from S. Because of that, according to the inverse-square law, (b) is doubled. I here demonstrate that spherically symmetrically distributed mass has its center of gravity at the distance $b/\sqrt{2}$ instead of b. As it concerns the gravitational potential, a sectional diagram of the density distribution is in parabola, and the mass is distributed inside the 3-dimensional space obtained by rotating the parabola around its axis, whose height is b. I here demonstrate that the center of gravity of that parabolic 3-dimesnsional space is at the distance $b/\sqrt{2}$ from the top.

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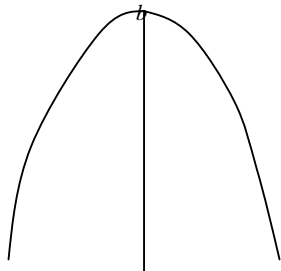
$$y = b - x^2$$

$$(1 - \tfrac{1}{\sqrt{2}}) \cdot b$$

_____

0

The entire volume or mass is:

$$\pi \int_0^b x^2 \, dy = \pi \int_0^b (1 - y) \, dy = \pi \, [by - \frac{y^2}{2}]_0^b = \pi (b^2 - \frac{b^2}{2}) = \frac{\pi b^2}{2} \qquad (c)$$

The volume or mass from the level 0 to $(1 - \tfrac{1}{\sqrt{2}}) \cdot b$ is:

$$\pi \int_0^{(1 - 1/\sqrt{2})b} x^2 \, dy = \pi \, [by - \frac{y^2}{2}]_0^{(1 - 1/\sqrt{2})b} = \pi (1 - \frac{1}{\sqrt{2}} - \frac{1}{2} \cdot \frac{3}{2} + \frac{1}{\sqrt{2}}) \cdot b^2 = \frac{\pi b^2}{4} \qquad (d)$$

Thus (d) is one half of (c), which demonstrates that the center of gravity is at the level of

$(1 - \tfrac{1}{\sqrt{2}}) \cdot b$, that is, at the distance $b/\sqrt{2}$ from the top.

Therefore, the angle of refraction for the case in which mass is distributed is, according to the inverse-square law:

$$\Delta\alpha \cong \tan\Delta\alpha = -4\frac{G\,M(b)}{c^2\,b}$$

  Thus, the gravitational-lens effect is perfectly demonstrated only by Newton's law of universal gravitation including time delay/advance. Neither special optics nor Einstein's time delay is necessary.

  There are some Japanese physicists who insist that a neutrino has mass. From the point of view of screw-structured model, I have already criticized it. Here I still require them to demonstrate that a neutrino follows the same trajectory that any other object having mass follows. If they do not succeed in it, that means it is experimentally demonstrated that a neutrino has no mass. It will be easier to observe it than the trajectory of a "photon", because a neutrino can be controlled to move at a much less velocity than light. In fact, neutrinos pass through any substance of an object, thereby, some of them passing also just beside the center of gravity, but have never been reported to be refracted a great deal. The gravitational-lens effect shows that an object with mass will greatly be refracted if it pass by a trajectory very close to the center of gravity.

Demonstration of why negative time in the action/reaction process is necessary
First I refute those conventional physicists who believe in Copenhagen doctrine (waves or action/reactions need no media to be transmitted) and believe that the transmission velocity of

action/reaction is finite.

1) Suppose that an electron is moving at the distance $|\vec{l}| = 1cm = 10^{-2}\,m$ from a positive electric charge at a velocity $|\vec{v}|$ whose direction is perpendicular to $\vec{l}$. If the electron whose size is approximately $r_0 = 2.818 \cdot 10^{-15}\,m$ of the classical electron radius, emits an action to the positive electric charge.
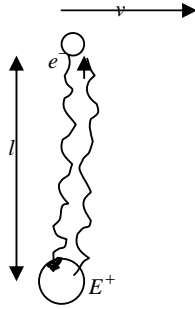
According to the supposition here, according to the conventional physicists' belief that no communication is faster than the velocity of light, it will take at least $\dfrac{2l}{c}$ seconds before the reaction is communicated back to the actor electron, so in the meanwhile, the electron moves a distance $v \cdot \dfrac{2l}{c}$ ahead. If the moved distance of the electron is bigger than: $\quad v \cdot \dfrac{2l}{c} > 2r_0$

then the reacting positive electric charge will lose sight of the moving electron. That is, if the velocity of the electron is bigger than:

$$v > \frac{r_0\,c}{l} = \frac{2.818 \cdot 10^{-15}\,m \cdot 3.0 \cdot 10^8\,m\,s^{-1}}{10^{-2}\,m} = 8.45 \cdot 10^{-5}\,m\,s^{-1} = 8.45 \cdot 10^{-2}\,mm \cdot s^{-1}$$

then the electron will never receive the reaction, that is, the trajectory of the electron will never curve toward the positive electric charge (, however large the positive electric charge is)!! Please note that here I favored the believers of Copenhagen doctrine by supposing the distance $|\vec{l}| = 1cm = 10^{-2}\,m$ between the actor and reactor is so small. If we suppose the distance to be $1m$ or $1000\,m$ or $3.0 \cdot 10^8\,m$, the result is still more catastrophic! The same is still truer for the interactions between the sun and the planets and between galaxies.

2) As we have seen that the so-called "photon" is nothing more than the electron-positron pair of vacuum on the trajectory of light, that is, a particle, we can reason in the same way as for the aforementioned electron. If there were no ether and if no communication is faster than the velocity of light, the "gravitational-lens effect" will never take place. Before the gravitational reaction comes back, the "photon" that moves at the very high velocity $3.0 \cdot 10^8\,m\,s^{-1}$, surely disappears and is nowhere to be found.

As a force or acceleration does not take effect if exerted only at a time point, it is necessary that an

action keeps on exerting the force for a certain period of time, during which the now famous equation $F_1 \cdot v_1 = -F_2 \cdot v_2$ should hold all the time. Therefore, admitting Newton's third law signifies that there is ether and some mediating connection between the actor and the reactor for the entire period of action/reaction. Now I reason that the standpoint of admitting Newton's third law and at the same time, negating the negative time coming back the same route along which the action was transmitted, is contradictory.

1) If that is the case, in the aforementioned example 1), this time, instead of going straight, the trajectory of the electron will surely curve but will curve past the point on the trajectory nearest to the positive electric charge, that is, the effect of the centripetal force from the positive electric charge will be delayed. But we have not observed such phenomena. For planets and galaxies, gravitational action will take effect only after years or millions of years later, and the reaction could come back longtime after the actor disappeared from the universe. In general, in the macro-world, among objects located at a distance l, at every end of the period of time $\frac{2l}{\alpha c}$, a motion whose time derivative of acceleration $\frac{da}{dt}$ is discontinuous would be produced. Especially when two interacting objects are far away, very clumsy motion will be produced.

2) "Gravitational lens" will take very delayed effect, beginning to curve largely past the nearest point to the source of gravity. But we have not observed such phenomena.

3) For the equation $F_1 \cdot v_1 = -F_2 \cdot v_2$, we cannot tell the forces and the velocities at what time we should use, because during one action/reaction cycle, we cannot fix the value of F_1 and v_1 if delayed reaction came back before the one action terminated and changed the value of F_1 and v_1.

4) When we use a lever of a long handle, if we use a strong force first then immediately decrease the force and the velocity of our arm, we would receive an unreasonably strong reaction that would still push back. Our self-restraint will get a further counter-action of retaliation. But this kind of phenomena is not observable.

"Quantum condition" (orbital electron emits no light) explained by action

Let us analyze now the substructure of a hydrogen atom and the timing of action emitted by the orbital electron and its relation with the time necessary for the electron to return to the same location. As Bohr radius is concerned here, I use Kozyrev's discrete transmission velocity of action instead of the continuous space-time relation where the space distance has the non-integer dimension. More precisely, I use the following modified Kozyrev's relation, which is different from Kozyrev's original relation inn that I use the real velocity of solar system against the static ether:

$$\frac{\delta x}{\delta t} = \frac{\alpha c}{2\pi}$$
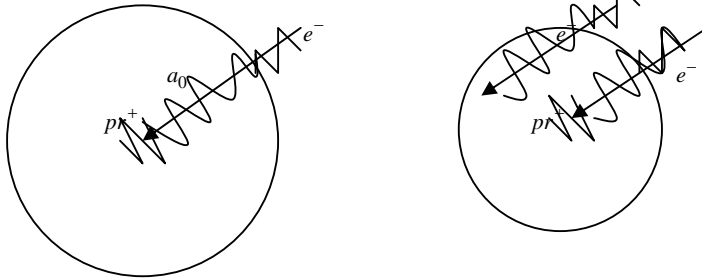
So, the time necessary for the action emitted by the orbital electron to reach the proton should be:

$$\delta t = \frac{2\pi r}{\alpha c} \quad \text{(a)} \quad \text{where} \quad r \quad \text{is the radius of the orbital electron.}$$

As the orbital electron is rotating along the orbit, being balanced with the Coulomb force:

$$\frac{1}{4\pi\varepsilon_0}\frac{e^2}{r^2} = m_e r\omega^2 = m_e r\left(\frac{2\pi}{\Delta t'}\right)^2, \quad (\Delta t')^2 = \frac{16\pi^3\varepsilon_0 \cdot m_e r^3}{e^2} \quad \text{(b)}$$

If we put $\delta t = \Delta t'$, we get the Bohr radius for r if only we use

$$\left(\frac{2\pi r}{\alpha c}\right)^2 = (\delta t)^2 = (\Delta t')^2 = \frac{16\pi^3\varepsilon_0 \cdot m_e r^3}{e^2}$$

$$a_0 = r = 4\pi\varepsilon_0\frac{\hbar^2}{m_e e^2} \quad \text{where I used} \quad \alpha = \frac{e^2}{4\pi\varepsilon_0\hbar c}.$$

The secondly possible radius can be obtained by equating: $2\dfrac{2\pi r}{\alpha c} = 2\cdot\delta t = \Delta t'$

The reason why δt is doubled is that <u>an electron **cannot** emit more **than one action simultaneously**</u>, and that the two actions, each of which takes the same time, should be emitted consecutively. Thus we correctly get a 4 times longer radius as the secondly possible radius.

  Please note that in the above reasoning, we counted the time necessary for one-way communication of the action from the orbital electron to the proton, and we got the exact Bohr radius. This is another evidence that in the process of action/reaction, "the time necessary for the reaction" does not count. The "tensity" of the chain of electron-positron pairs carrying the action from the electron to the proton will bring back the electron to the same radius against a slight oscillation. Thus the stability of the orbit at Bohr radius is assured.

  If the radius takes a value other than these discrete values, the orbital electron will not come back at the same location at the moment the action reaches the destination proton. Chains of electron positron pairs of vacuum will have tendency to remember the direction in which the action was emitted, and if the electron finds itself at a different location at the moment the action reaches the proton, the electron will be clutched by a chain of electron positron pairs with the memory of that direction and will be carried in that direction, thus it is no longer possible for the

axis of the electron to point to the proton.

This is the sub-structural explanation of the "**quantum condition**", using the concept of Newton's action and that of screw-structured particles derived from it.

**Second term of Lorentz force explainable by the screw-structured model**

The last chapter can be seen as the one that describes the first term of Lorenz force, because the objects are not initially in motion. Now I explain the second term of Lorentz force, which observes Fleming's law of the left hand.

$$\vec{F} = Q \cdot (\vec{E} + \vec{v} \times \vec{B})$$

Indeed, the second term of Lorentz force is not produced by a simple clutching mechanism of the screw-structured particle that we normally find in other kinds of interaction processes. In this case, the flow of electrons is <u>discontinuously redirected by the screw mechanism</u> but at the moment of redirection, it is the clutching groove of the rotating screw that exerts the force of redirection. As I mentioned it in the last chapter, v in the equation of Newton's third law for the case of a process in a field is not the velocity of a linear motion but is a rotational velocity. In the case of the second term of Lorentz force too, the two "velocities" that participate in forming the force of the second term, are the rotational velocity of the free electron and that of the electron-positron pair of vacuum, which sends forward the rotating chain of electron-positron pairs, that is, "magnetic line of force". A magnetic flux is also a rotating (i.e., moving forward) chain of electron-positron pairs of vacuum, produced when electricity (set of electrons) really flows.

Here, using the screw-structured model, I explain the mechanism how the second term of Lorentz force is produced. Its quantity is well precisely defined by the Lorentz formula. I show how that direction of the force is inevitably produced. Please remember that the direction of electric current is opposite to that of real flow of electrons.

In the first figure, the current of an electron which is an anti-clockwisely rotating anti-clockwisely winding screw with its axis pointing to the direction of motion, <u>touches **from above**</u> the anti-clockwisely rotating (i.e., advancing) chain of anti-clockwisely winding electron-positron pair screws of the magnetic line of force. The current of the electron is **pushed back**, by the anti-clockwisely rotating spiral of the electron-positron pair of vacuum, in the direction opposite to that of that current. The electric current trying to pass the <u>upper side</u> has **difficulty** <u>to pass through</u>.

Electric current

Magnetic line of force
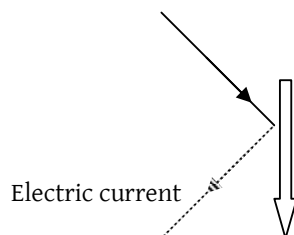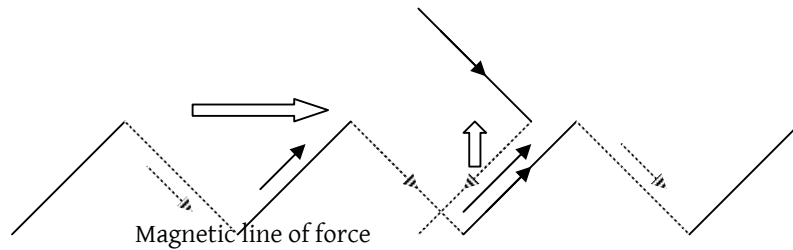
In the second figure, the current of an electron which is an anti-clockwisely rotating anti-clockwisely winding screw with its axis pointing to the direction of motion, touches **from beneath** the anti-clockwisely rotating (i.e., advancing) chain of anti-clockwisely winding electron-positron pair screws of the magnetic line of force. This electric current of the electron is **promoted forward**, by the anti-clockwisely rotating spiral of the electron-positron pair of vacuum, in the same direction as that of the original electric current. The electric current passing beneath is **promoted** to pass through.

Current of electrons

Magnetic line of force
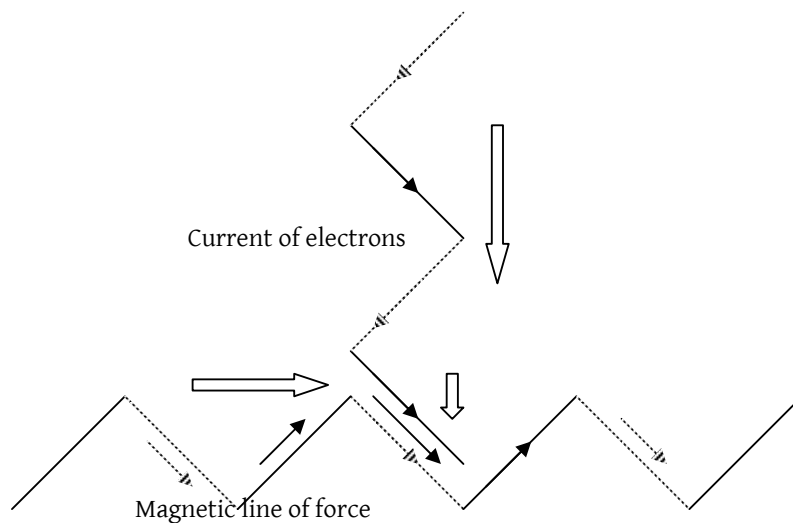
This promotion of letting the electric current pass beneath and the prohibition of passing upper side, is the reason why the electron arriving at the upper side of the magnetic line receives a **force directed downward** which in fact is physically exerted by the coming-downward (because rotating anti-clockwise) side of the magnetic line spiral facing the arrived electron. This is exactly the direction defined by the outer product of $\vec{v}$ and $\vec{B}$: $\vec{v} \times \vec{B}$.

Advance, delay, and reversal of time by rotation of electron-positron pair of vacuum

Let us quantitatively examine the relation between the advance, delay, reversal of time and the rotational velocity of electron-positron pairs of vacuum.

1) An action is always sent out in anti-clockwise rotation

2) Relatively large mass or a large electric charge emits a relatively fast rotating chain of electron-positron pairs.

3) Depending on which of the anti-clockwise or clockwise spiral of the reactor the action clutches to, the direction of the acting force and the direction of the time flow are determined. If the clockwise spiral of the reactor is clutched, the time is reversed and flows in the negative direction. The absolute value of the force exerted on the reactor is proportional to the rotational velocity of the electron-positron pairs of vacuum.

4) In case the reactor is the electron-positron pair itself, if the clockwise spiral of the positron is made by the action advance in the direction in which the electron-positron pair was advancing before it received the action, then the time advances, and if the clockwise spiral of the positron is made by the action advance in the direction opposite to which the electron-positron pair was advancing before it received the action, then the time is delayed.

In case of time advance and delay by gravity, the gravitational action emitted by mass seems to clutch the clockwise spiral of the positron of electron-positron pair of vacuum. If light is coming down to the earth, anti-clockwise rotating gravitational action emitted by the mass of the earth pulls closer the clockwise spiral of the positron of the electron-positron pair vacuum. Thus the clockwise spiral of the positron is made to advance in the same direction, and the time advances. If the light is going up from the earth, the anti-clockwise rotating gravitational action emitted by the mass of the earth will draw the clockwise spiral of positron of vacuum in the opposite direction, and the time delays.

In case of heating a balloon from outside, inside the balloon electromagnetic waves of electron-positron pairs should be advancing away from the source of heat outside. When still another electromagnetic action with its anti-clockwise rotation acts on the electron-positron pair from behind, the clockwise spiral of the positron is pulled back, that means, in the direction opposite to the direction of motion of the electron-positron pair. So the time delays, that is, the time grain becomes smaller and $v = \frac{dx}{dt}$ of molecules becomes greater in conformity with thermodynamics.

Some technological considerations

In the chapter "Newton's and Coulomb's inverse-square law Derived from Newton's Third Law!",

we have considered the case of reducing the distance between electric charges by half. Then, 2^2 times more force and 2 times more rotational velocity of the actor is transferred along a chain of electron-positron pairs of vacuum to the reactor which is clutched by the electron-positron screw of the same structure, thus equally assuring a 2 times more rotational velocity for the reactor, and as a consequence, according to Newton's third law, the reacting force becomes 2^2 times more. An action is the power whose dimension is $W = J\,s^{-1}$. We have seen that if only we put electric charges in the space, when the space-distance is reduced to $1/2$, i.e., the space volume is reduced to $1/2^3$, the action becomes 2^3 times more. And please be aware that that energy is provided by the vacuum at each moment of time, if only we put electric charges in the space. So if we fractally put a pair of the aforementioned electric charges in each of 2^3 subspaces which are of 2^3 times reduced volume, in the entire space, we get $2^3 \cdot 2^3 = 2^6$ times more power. As in the vacuum there are so many interacting pair of an electron and a positron, we can say that the vacuum has inexhaustible energy.

The above reasoning demonstrates that perpetual motion is possible, where if only electric charges are put in the space, the energy for the action/reaction is provided by the vacuum. The energy possibly taken from those electrically charged objects is in the form of action, i.e., pushing/pulling force and rotational motion. Even if we ignore the centripetal/centrifugal forces, the interacting electric charges will be in perpetual rotational motion, without any energy provided by a human from outside. Conventional physicists believed to have demonstrated that no perpetual motion is possible. However, they always wondered and secretly asked themselves **why atoms and molecules are, in fact, perpetually in motion**. They have never had enough courage to demonstrate that atoms and molecules are not an example of perpetual motion!

From this theoretical result, if only we postulate some device that can take out that energy in the form of action, we can think about huge technological possibilities. Instead of the dangerous nuclear energy taken out by destroying the nucleus, we can use the clean interaction energy constantly provided by the vacuum.

Frontal Criticism of the Second Law of Thermodynamics

Conventional thermodynamics derives its Second Law from their definition of entropy:

$$\int_{A}^{B} \frac{\Delta Q}{T} = S_B - S_A \quad \text{where} \quad \Delta Q \text{ is the "absorbed heat and work quantity"}$$

The second law of thermodynamics is: "Any change which a (closed) system, which neither heat nor work does not goes in or goes out, makes, brings about entropy increase." I precisely demonstrate here that this is a complete fake. They introduce the famous example: "Gas is in one room and there is only vacuum in the adjacent room. If we remove the wall between the two rooms, the molecules of the gas will spontaneously spread into the vacuum. As no energy is added

to nor extracted from the gas, if we try to push the spread molecules back to the former one room, we have to do work. Thus, though all the molecules have put back in the same space, in order to recover the original status, we cannot but make the gas discharge the energy." This is a fake. <u>The **molecules spreading** to **the other room** is **Doing Work against the Electron-Positron pairs of the Vacuum Ether.**</u> With this viewpoint, the above process is **not different** from the process of letting the pressure push the wall which allows the volume of gas room to spread and then diminishing the volume without missing any molecule of the gas by exerting pressure on the wall, according to **Boyle Charles law**. According to Boyle Charles law, <u>energy as work is discharged as the wall is pushed by the pressure</u> of the gas, and the same amount of energy as work is absorbed as the wall is pushed back to the former position. For the aforementioned famous example they proposed, **Boyle Charles law** itself demonstrates **Zero Increase of Entropy**. To tell the truth, if we analyze the real process in detail, comparing the chaining of action/reaction, we can detect that the entropy can be even slightly negative. I demonstrate it below.

 <u>Moreover, **They** are **Totally Unaware** that **Anti-Entropy** takes place especially when particles **Interact**</u>. They proposed an example similar to Boyle Charles law which treats only the action/reaction of colliding particles, where molecular particles are colliding against the electron-positron pairs of the vacuum and against the walls of the gas room. Gravitational action/reaction and electromagnetic action/reaction are the other two important kinds of action/reaction. Conventional thermodynamics do not take these two kinds of action/reaction, but <u>they believe their definition of entropy takes all sorts of physical entropies (and they firmly believe that with that definition, their second law of thermodynamics dominates all physics)</u>. And, in fact, I demonstrate below that if they take all sorts of processes, the entropy itself they defined can get even strongly negative value. Concept of entropy that does not take all sorts of interactions of particles into account is a fake.

 In order to demonstrate it, I first analyze the relation between temperature and time.

Analysis of the relation between temperature and time

 In order to analyze the relation between temperature and time, let us study Boyle-Charles law.

Boyle-Charles law is: $\dfrac{P \cdot V}{T} = Const$

As we deduced for the case of heating in the chapter "Analysis of the structure of a lever and a screw applied to the electron-positron pair", the velocity of a particle is proportional to the force

or pressure: $P \propto \dfrac{dx}{dt}$

 Let us first consider the case in which $V = x^3$ is kept constant. As x^3 is kept constant, the space grain dx will be also kept constant, because dx is inversely proportional to x^3 as I

deduce below.

$$\frac{P \cdot V}{T} \propto \frac{\dfrac{dx}{dt} \cdot x^3}{T} = \frac{\dfrac{Const}{dt} \cdot Const}{T} = Const$$

from which we can deduce:

$$T \propto \frac{1}{dt} \qquad\qquad\qquad\qquad (a)$$

By introducing this relation into Boyle-Charles law, we get:

$$\frac{P \cdot V}{T} \propto \frac{\dfrac{dx}{dt} \cdot x^3}{T} \propto \frac{\dfrac{dx}{dt} \cdot x^3}{1/dt} = x^3 dx = Const \qquad (b)$$

If we next consider the case in which the pressure, that is, $\dfrac{dx}{dt} = Const$, and the temperature is

raised from T to $2T$. From the relation $T \propto \dfrac{1}{dt}$ (a) above, $dt \to dt/2$. And as $\dfrac{dx}{dt} = Const$,

$dx \to dx/2$. In the above equation (b), if $dx \to dx/2$, then $x^3 \to 2x^3$ is correctly deduced. The relation $x^3 dx = Const$ (b) signifies that the volume of the space and the size of its space grain are inversely proportional.

 The relation (a) is an important relation. At an extremely low temperature near absolute zero, all the particles move at a very low velocity, at a high temperature, molecules of gas and at a very high temperature, particles in plasma are moving at a high velocity. Conventional thermodynamics does not explain the mechanism how the particles change their velocity. Conventional physicists say only that according to energy conservation law, as energy is given as heat, heat energy is transformed into kinetic energy. But how?! In our human society, unless they bring about an engine that transforms heat energy into kinetic energy, even a bit of the heat energy is never transformed into kinetic energy. I answer that it is the time whose velocity becomes higher when the temperature gets lower and whose velocity becomes smaller when the temperature gets higher, that enables the physical velocity of particles to diminish and to increase respectively. And those acceleration and deceleration of time velocity according to decrease and increase of temperature is carried out by the electron-positron pairs rotating at a slower speed and at a higher speed respectively.

Two Demonstrations of Boyle Charles law

1) I demonstrate why the pressure times the volume divided by the temperature stays constant:

$$\frac{P \cdot V}{T} = \frac{P \cdot (\Delta V + \Delta V + \cdots + \Delta V)}{T} = \frac{\sum\limits_{i=1}^{N} P \cdot \Delta V}{T} = \frac{\sum\limits_{i=1}^{N} P x^2 \cdot \Delta x}{T} = \frac{\sum\limits_{i=1}^{N} F \cdot \Delta x}{T}$$

$$= \frac{\sum\limits_{i=1}^{N} \Delta E}{1/\Delta t} = \sum\limits_{i=1}^{N} \Delta E \cdot \Delta t = \sum\limits_{i=1}^{N} (\pm \hbar) = \pm J \hbar \quad \text{where} \quad J < N \quad \text{is an integer.}$$

Please note that as $\hbar$ in Heisenburg's uncertainty principle can have negative or positive value according to the direction of action. As Plank constant multiplied by a constant J is constant, $\frac{P \cdot V}{T}$ stays constant.

2) By using the principle $x = a \cdot t^{\frac{2}{3}}$ which holds in interaction processes (and

$M = b t^{-\frac{1}{3}}$ which I demonstrated in my thesis), I demonstrate why the pressure times the volume divided by the temperature is dimensionless of time, that is, its value does not change even if time changes:

$$\frac{P \cdot V}{T} = \frac{\left(M \frac{d^2 x}{d t^2} \frac{1}{x^2} \right) \cdot x^3}{1/dt}$$

$$= \frac{(N b t^{-\frac{1}{3}}) \cdot (\frac{2}{3} \cdot (-\frac{1}{3}) a t^{-\frac{4}{3}}) \cdot a t^{\frac{2}{3}}}{1/dt} \quad \text{where} \quad N \quad \text{is the number of particles in} \quad V .$$

$$= Const \cdot N t^{-1} dt$$

$$= Const \cdot \frac{N \, dt}{t}$$

$$= Const \cdot \frac{N \, dt}{dt + dt + \cdots + dt}$$

$$= Const \cdot \frac{N \, dt}{N \, dt}$$

$$= Const$$

Please note that these derivations 1) and 2) are in conformity with "Plank constant is dimensionless with regard to time" which I deduced in the chapter "Also Plank constant as "action" has no time dimension".

Entropy defined in conventional thermodynamics is equivalent to sum of $\pm \hbar$.

Let us go back to the definition of entropy by conventional thermodynamics:

$$\int_A^B \frac{\Delta Q}{T} = S_B - S_A \quad \text{where} \quad \Delta Q \text{ is the "absorbed heat and work quantity"}$$

ΔQ is in fact change of energy ΔE.

Therefore:

$$dS = \frac{\Delta Q}{T} = \frac{\Delta E}{1/\Delta t} = \Delta E \cdot \Delta t = \pm \hbar$$

And: $\quad S_B - S_A = \int_A^B \frac{\Delta Q}{T} = \int_A^B dS = \sum_A^B (\pm \hbar)$

In physics, they believe that entropy is a dimensionless concept. I have already demonstrated that Plank constant is dimensionless in interaction processes. If it is dimensionless of time, it is totally dimensionless, because in this dissertation, the only dimension is time. So, what they call "entropy" is equivalent to Plank constant.

In physics, they believe that entropy is "additive", that is, entropy is a physical entity that they can sum up. In fact, they can add up Plank constants, and will get both positive and Negative values, to their Deep Regret! And the summing-up will be a little complicated, because they have to distinguish reaction from action to see the negative or positive signs.

Criticism of Boltzmann's definition of entropy

Using his "Boltzmann constant", Boltzmann defined entropy as:

$$S = k \cdot \ln W(E) \qquad \text{(a)}$$

where $W(E)$ is "the number of quantum states not higher than the energy level E ".

Entropy in thermodynamics is defined as:

$$\Delta S = \frac{\Delta E}{T} \qquad \text{(b)}$$

$$\sum \Delta S = \sum \frac{\Delta E}{T} = \frac{\sum \Delta E}{T}$$

$$S = \frac{E}{T} \qquad \text{(c)}$$

If we make his definition conform to this entropy definition in thermodynamics, $W(E)$ should have the following form:

$$W(E) = \exp(E/kT) \qquad \text{(d)}$$

because: $S = k \cdot \ln W(E)$

$$= k \cdot \ln\{\exp(E/kT)\} \qquad \text{(e)}$$

$$= k \cdot \frac{E}{kT}$$

$$= \frac{E}{T}$$

When we analyze how we constructed Boltzmann's entropy, we understand that k may be any constant and is not necessarily equal to "Boltzmann constant" at all. Or better to say, if we review (e) and remember that $T = 1/\Delta t$, we derive:

$$S = k \cdot \ln\left\{\exp\left(E/k\,T\right)\right\} = k \cdot \ln\left\{\exp\left(\frac{E \cdot \Delta t}{k}\right)\right\}$$

$$= k \cdot \ln\left\{\exp\left(\frac{\left(\sum \Delta E\right) \cdot \Delta t}{k}\right)\right\}$$

$$= k \cdot \ln\left\{\exp\left(\frac{\sum\left(\Delta E \cdot \Delta t\right)}{k}\right)\right\} \quad \text{and using directed uncertainty principle}$$

$$= k \cdot \ln\left\{\exp\left(\frac{\sum(\pm\hbar)}{k}\right)\right\} \qquad\qquad \text{(f)}$$

Now we understand that it is much clearer to replace "Boltzmann constant" k by Plank constant $\hbar$. Hence, (f) is still transformed into:

$$= \hbar \cdot \ln\left\{\exp\left(\frac{\sum(\pm\hbar)}{\hbar}\right)\right\}$$

$$= \hbar \cdot \ln\left\{\exp\left(\sum(\pm 1)\right)\right\}$$

$$= \sum(\pm\hbar)$$

So, we see that entropy can decrease as well as increase. In fact, we do not need Boltzmann constant at all.

So, we have seen that their equation (d) specifying their "number of quantum states not higher than the energy level E" had better be replaced by:

$$W(E) = \exp\left(E/\hbar T\right) \qquad\qquad \text{(d')}$$

However, Boltzmann himself talks about something similar to this term:

$$\exp\left(-E/k\,T\right) \qquad\qquad \text{(g)}$$

, which according to him, is "the Probability of a system in Thermal Equilibrium at an absolute temperature T finding itself at the energy state E". It is reasonable that if $W(E)$ is "the number of states", its reciprocal is "the probability" of one of its states to be occupied. But in that case, the equation (a) should get a minus sign in front:

$$S = -k \cdot \ln\left\{\exp\left(-E/k\,T\right)\right\}$$

$$= -k \cdot \left(-E/k\,T\right)$$

$$= E/T$$

Boltzmann does not want to admit that as (g) shows that a higher energy level E/T has less

probability, the energy will tend to decrease as time goes by, thus Decreasing the entropy. Moreover, as we have seen in the chapter "Frontal criticism of second law of thermodynamics", conventional physicists ignore the energy loss of a system by the system acting on electron-positron pairs of the vacuum ether. Though they Assure "thermal equilibrium", here and there the particles of the system acting on electron-positron pairs of vacuum ether will lose energy, causing Decrease of entropy of their definition.

Now Boltzmann may want to put a minus sign from the very beginning in the definition itself of entropy:

$$\Delta S = -\frac{\Delta E}{T} \qquad\qquad\qquad\qquad \text{(b')}$$

and $\qquad S = -\dfrac{E}{T}$ $\qquad\qquad\qquad\qquad$ (c')

but according to thermodynamics, this negative energy is special energy Intentionally introduced in order to decrease the entropy. This is a contradiction. Boltzmann was talking about probabilistic spontaneous state transitions.

How to correctly define entropy

Considering that in interaction processes, an actor and reactor may have different times, let us review the derivation:

$$dS = \frac{\Delta Q}{T} = \frac{\Delta E}{1/\Delta t_1} = \Delta E \cdot \Delta t_1 = \frac{\hbar}{\pm \Delta t_2} \cdot \Delta t_1 = \pm \hbar \frac{\Delta t_1}{\Delta t_2}$$

because the uncertainty principle is: $\Delta E \cdot \Delta t_2 = \pm \hbar$.

Let us pay attention to the quotient . We find this quotient very meaningful exactly in the equation of Newton's third law:

$$F_1 \cdot v_1 = -F_2 \cdot v_2$$

$$F_1 \cdot \frac{dx}{dt_1} = -F_2 \cdot \frac{dx}{dt_2}$$

According to this equation of Newton's third law;

1) positive entropy signifies the case: $\;|v_1| < |v_2|\;$ hence $\;|F_1| > |F_2|$
2) zero entropy signifies the case: $\qquad |v_1| = |v_2|\;$ hence $\;|F_1| = |F_2|$
3) Anti-entropy signifies the case: $\qquad |v_1| > |v_2|\;$ hence $\;|F_1| < |F_2|$

The comparison between $\;|v_1|\;$ and $\;|v_2|\;$ can be replaced by $\left|\dfrac{dx}{dt_1}\right|$ and $\left|\dfrac{dx}{dt_2}\right|$, which further can

be replaced by $\;|dt_1|\;$ and $\;|dt_2|$.

1) $\;|dt_1| > |dt_2|\;$ signifies positive entropy
2) $\;|dt_1| = |dt_2|\;$ signifies zero entropy

3) $|d\,t_1| < |d\,t_2|$ signifies Anti-entropy

This classification can be reformulated as:

1) $\left|\dfrac{d\,t_1}{d\,t_2}\right| > 1$ signifies positive entropy, because $\ln\left|\dfrac{d\,t_1}{d\,t_2}\right| > 0$

2) $\left|\dfrac{d\,t_1}{d\,t_2}\right| = 1$ signifies zero entropy, because $\ln\left|\dfrac{d\,t_1}{d\,t_2}\right| = 0$

3) $\left|\dfrac{d\,t_1}{d\,t_2}\right| < 1$ signifies Anti-entropy, because $\ln\left|\dfrac{d\,t_1}{d\,t_2}\right| < 0$

Therefore, we can define entropy as:

$$d S = \ln\left|\frac{d\,t_1}{d\,t_2}\right|$$

Entropy defined in this way is additive, because in a chain of action/reaction processes, we can simplify the calculation by using the additiveness of the logarithmic function:

$$\int_A^K dS = \ln\left|\frac{d\,t_A}{d\,t_B}\right| + \ln\left|\frac{d\,t_B}{d\,t_C}\right| + \cdots + \ln\left|\frac{d\,t_J}{d\,t_K}\right| = \ln\left|\frac{d\,t_A}{d\,t_B}\cdot\frac{d\,t_B}{d\,t_C}\cdots\frac{d\,t_J}{d\,t_K}\right| = \ln\left|\frac{d\,t_A}{d\,t_K}\right|$$

[N.B.] From this result, we can say that the way we calculated $\dfrac{v_1}{v_2}\cdot\dfrac{v_2}{v_3}\cdot\dfrac{v_3}{v_4}\cdots\dfrac{v_{n-1}}{v_n} = \dfrac{v_1}{v_n}$ in the preceding chapter "Artificial Neural Network model based on Newton's Anti-Entropy" was right.

Entropy definition for many-body problems

Let us now review Prof. A. P. Smirnov's equation for many-body problems:

$$\ln\frac{M}{M_0 - M} - \ln\frac{M_p}{M_0 - M_p} = a_p\left|\frac{D - D_p}{D_p}\right|^{\frac{K}{2}}$$

The ratio $\dfrac{D - D_p}{D_p}$ can be that of the pressure, temperature, or magnetic field. In the chapter "Analysis of the structure of a lever and a screw applied to the electron-positron pair", I demonstrated that according to the equation of Newton's original third law, in interaction processes, the pressure or force is proportional to the velocity $\dfrac{d\,x}{d\,t}$, whose denominator shows, as

I defined the temperature as $T \propto \dfrac{1}{d\,t}$, that the ratio of pressure should be equivalent to the ratio of temperature. So can define entropy for many-body problems as:

$$d S = \ln\left|\frac{D - D_p}{D_p}\right| = \frac{2}{\kappa}\cdot\left\{\ln\left(\ln\frac{M}{M_0 - M} - \ln\frac{M_p}{M_0 - M_p}\right) - \ln a_p\right\}$$

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If we integrate this equation, we get:

$$S = \int dS = \left| \frac{D - D_p}{D_p} \right| \cdot \left\{ \ln \left| \frac{D - D_p}{D_p} \right| - 1 \right\}$$

The figure is the graph of this entropy, which shows nega-entropy for the interval . Please note that as the nega-entropy is found on the left-hand slope of the valey, we can stably make search by lowering the entropy from the right-hand positive slope. Please compare this graph with the one for "conventional information entropy" in the chapter "Criticism of conventional information entropy".
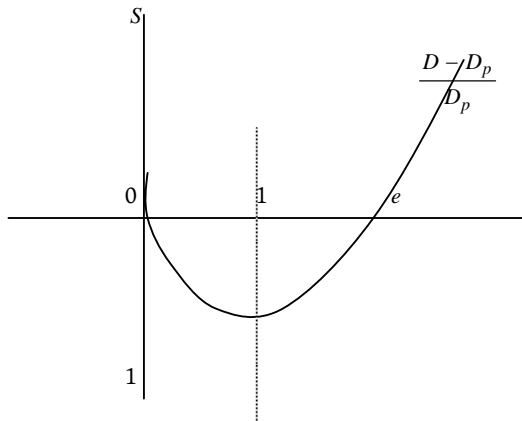

Criticism of conventional information entropy

  In my thesis, I mentioned that the reason why conventional information entropy fails in learning is firstly that their information entropy has nothing to do with the physical world, and secondly that their definition of information entropy is based on "probability", that is, an excessively convenient scalar value that can never exit in our universe. Here I further criticize the concept of conventional information entropy, by showing the instability and contradiction of their search. The conventional information entropy is defined as:

$$S = -p \cdot \ln p \qquad \text{where} \quad 0 \le p \le 1 \quad \text{is the probability.}$$

The figure is the graph of this conventional information entropy.
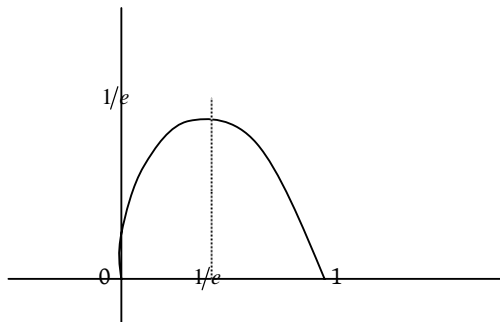
The researchers in conventional artificial intelligence are, in fact, trying to "Decrease" the entropy in order to do a useful search. However, as they believe that entropy starting from zero value and monotonously increasing according to the second law of thermodynamics should have an overall positive value, they put the entropy graph upside down so that entropy may have positive value everywhere. And when they make a search with this graph by trying to decrease the entropy value, the search is unstably ramified into the left extreme and the right extreme. Moreover, as events of higher probability are more probable to take place, their search tends to search the right-hand coming-down slope, which, in fact, is meaningless as an anti-entropy search.

About possible "cold" nuclear reaction inside biological bodies

In his book "Insight: Crisis of Modern Physics", Prof. A. P. Smirnov, emphasizing strong anti-entropy processes in biological bodies, refers to some surprising reports in biology, such as "when a man breathes, 20% of the inhaled nitrogen stays inside the organism", "a man is consuming considerably more energy than what is taken in as food", which may lead us to think about a possible cold nuclear reaction in living organism without disturbing normal life activities, such as:

$$N_2^{14} \rightarrow C^{12} + O^{16}$$
$$N^{14} \rightarrow C^{12} + H_2^1$$
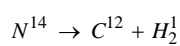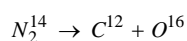
And he further refers to C. L. Kevran's report report: "Preuve en biologie de transmutation a faible energie", Maloine Ed., Paris 1975, P. 210, which gave detailed balance of several kinds of atoms, showing that, in some cases, he found 10 times more of certain atoms inside the organism of a plant than what was taken in from outside, seeming to cause a production of new atoms of atomic mass unit increased by 1 or 16, while the amount of the atoms originally taken in from outside and used for the production decreased.

$$\Omega^n \rightarrow \Omega^{n+1}$$
$$\Omega^n \rightarrow \Omega^{n+16}$$
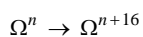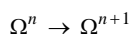
This means that in a living organism, nuclear fusions or syntheses are taking place without disturbing normal functioning of life.

According to what I myself deduced in this dissertation which emphasized anti-entropy processes enabled by Newton's original third law, supporting it with the model of screw-structured particles and screw-structured electron-positron pairs of vacuum, which can delay/advance and reverse the Time, moreover, under micro-oscillation of physical time, I myself think that such "cold" nuclear reactions or "cold nuclear fusions" will become possible, if only DNA having clockwise winging spirals, retards or reverses the Time when receiving the radiation emitted by proteins of left-hand chyrality. When the velocity of time is almost zero, the virtual

temperature is infinitely large, which should enable "cold nuclear reaction" or "cold fusion" at will in anti-entropy processes.

About the definition of information quantity or information entropy

In my thesis, I criticized the conventional definition of "information entropy" by saying that the two reasons why their definition is wrong are: firstly that their information entropy has no relation with the physical entropy of the physical world, and secondly that their definition is based on the concept of probability, while such an excessively convenient scalar number like "probability" can never exist in this universe.

I demonstrated in this dissertation that Boltzmann's definition of entropy $S = k \ln W$ having as the physical definition of probability $p = \exp(-E/kT)$ can be transformed into: $S = \ln p = \ln\{\exp(-E/T)\} = -E/T$ by canceling Boltzmann constant and putting $p = \exp(-E/T)$. The criticism against the existence of the concept of physical entropy can be done by pointing out that their E is the energy summed up ignoring actions exerted on the vacuum ether, so their physical "probability" has a totally undefined value. Shanon's definition of information entropy was: $S' = -p \cdot \ln p$. Thus, we can see that Shanon's information entropy $S' = p \cdot S$ or $S' = p' \cdot S$ is the physical entropy multiplied by another probability. This signifies that their definition of information entropy lost the relation to the physical world, because $S' = p' \cdot S = p' \cdot (E/T) \neq E/T$. So, p' should be different from the "physical probability" in Boltzmann's sense: $p' \neq p$. Therefore, their "information entropy" is a totally undefinable concept. Let us now criticize also this concept of "information probability".

$p' = S'/S = [Information\, Entropy]/[Physical\, Entropy]$,

where the physical entropy summed up ignoring actions exerted on the vacuum ether can never represent the entirety of energy, and where the information entropy has a totally undefined value as I deduced above. Therefore, the "information probability" is a totally undefinable concept. It cannot represent even some kind of ratio of something against some kind of entirety.

In a preceding chapter of this dissertation, I demonstrated that the reason why the second law of thermodynamics, that is, the law of "monotonous increase of entropy" is wrong is that the conventional physicists ignore the actions exerted on the electron-positron pairs of vacuum ether. In Phase II of this dissertation, I defined the "quantity of information" or "information entropy" as a sum of actions exerted on the vacuum ether. This was right. As a consequence, this definition of "information entropy" of mine is based on a standpoint that fundamentally criticizes the "law of monotonous entropy increase". Moreover, in Phase III of this dissertation, I have demonstrated that the so-called "dimensionless" entropy has the same dimension that Plank constant, that is, "unit of action" has. This too justifies the definition of information entropy as a sum of actions in Phase II of this dissertation. Besides, this standpoint of criticizing the law of "monotonous increase

of entropy" by the actions exerted on the vacuum ether, fundamentally criticizes also the concept of "probability", because this standpoint of mine perceives the existence of actions exerted on the "nil", i.e., on the vacuum ether, whereas probability theorists, statisticians, and conventional physicists never define probability for actions exerted on the nil or what does not exit to their eyes.

Further topics for post-doctoral research

  I have to stop writing now. Reviewing the several topics I treated in the second phase of this dissertation from the quantitatively precise point of view obtained in the third phase will be topics of my post-doctoral research. The second phase of this dissertation was based on the screw-structured model, but it treated the question of time delay/advance and reversal only qualitatively, based solely on Kozyrev's discrete transmission velocity of action/reaction, which should not have been precise enough. There are still other extremely interesting topics like "temperature of vacuum and its relation with time delay/advance and reversal" or "temperature of vacuum and its relation with mass located in the space of the vacuum and its gravity": $T^2 \propto 1/(dt)^2 \propto 1/r^2$?, $T \propto 1/dt \propto 1/r$?, $T \propto 1/dt \propto \sqrt{M}$?, etc., that is, hypothesis: "meteorites or planets move fast near a star of big mass but slows down in a space far from stars, because the vacuum temperature near the star is high because of the mass while the vacuum temperature of a space far from any stars is low because of the feeble gravity", for instance, or, "an electrically charged particle moves or rotates fast near a particle of large electric charge but slows down in a space far from the electric charge, because the vacuum temperature near the electric charge is high because of the electric charge while the vacuum temperature of a space far from any electric charge is low because of the feeble electric field", for instance, etc. All those topics will be studied in my post-doctoral research.

Further Research Schema in Physics, Anti-Entropy Processes, and Learning

1. Without using any probability theories or statistics, construct anti-entropy learning functions

   for the "bodily protein learning" by DNA and for the "intelligence learning" by neural network.

1.1 Reformulate the entire modern physics: quantum physics, theories of particles, astrophysics,

   based on Newton's Third Law of action/reaction and the model of screw-structured particles

   derived from it, and micro-oscillation of physical time.

1.1.1 In order to verify the time advancement and a possibility of variable velocity of light based on

   the chapter "Red shift and Time Delay", measure the Coulomb force between two electric

charges located at some horizontal distance and at different altitudes where light is illuminating in the direction from the electric charge at higher position toward the one at the lower position. Compare this with the Coulomb force between two electric charges located at horizontally the same distance. My hypothesis is that as the light velocity c is increased, the dielectric constant of vacuum ε_0 should decrease, so the Coulomb force between the aforementioned electric charges at different altitudes will be slightly bigger.
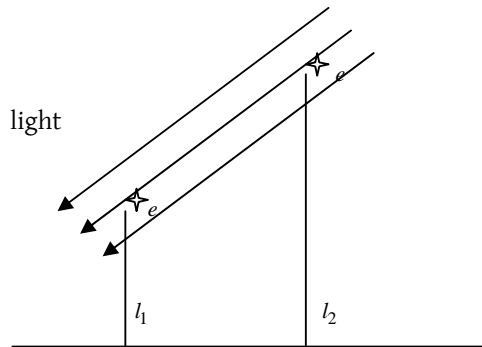
1.1.2 Study more in detail the structure of an electron and especially of a positron, and in what way they are combined and disappear into the vacuum, producing a gamma-ray, and in what way an electron and a positron collide each other and are broken into neutrinos.

1.1.3 Make an experiment of Compton scattering with a Positron to verify the "negative time" and the principle "One Rotation One Action".

1.1.4 Apply a ray of a very high frequency exactly perpendicular to a very precise mirror, and see if neutrinos ν and $\bar{\nu}$ are produced, or if e^- and e^+ ,or a gamma-ray are produced on the surface of the mirror, or if the electromagnetic waves advancing in the exactly opposite directions, cancel each other, which might produce zero temperature along the canceled trajectory of the light.

1.1.5 Make an experiment to take out of the vacuum an electron-positron pair so much biased from each other that we could measure the electrical charges of the dielectric electron and positron of the pair and could weigh the mass.

1.1.6 Study in more detail the characteristics of both the static ether and dynamic ethers, and their

interaction.

1.2 Based on 1.1, **inductively** construct a set of axioms of theories of physics that can automatically generate algorithms that describe how the actor and reactor particles were created and in what sequence the action/reaction chained one after another or what parallel sequences of action/reaction are necessarily combined in what timing. This is to explain and simulate the real dynamics of many-body problems that takes place in the micro-world of atoms and molecules, be it at a normal temperature or at a very low temperature under an electromagnetic field and/or a gravitational field.

1.3 From the point of view of energy, analyze the action and reactions between DNA and proteins to find out biochemical self-organizing anti-entropy processes which will be identified as energy concentration in the specified space, thereby making use also of information released by the "Genome Project".

1.4 Using the screw model of physics based on Newton's third law, simulate the anti-entropy processes of the creation and functionality of proteins and DNA, in order to see if DNA can lengthen itself teleologically by learning in a sufficiently long period of time.

1.5 From the point of view of energy, analyze the metabolism of neurons to find out chemical anti-entropy processes. Verify also if that is practically equivalent to some "cold nuclear reaction" and "cold fusion".

1.5.1 Using the screw model of physics based on Newton's third law, simulate the anti-entropy process of the creation of proteins by DNA for a memorization of neurons, and simulate how remembering such a gigantic amount of past memory takes place, using both the proteins and the "time machine effect" which would be enabled by the neural network of the non-orientable structure of Klein's tube. Examine the energy balance inside the neural network to verify there is some activity of remarkable "cold nuclear reaction" and "cold

fusion" inside.

1.6 Verify to what extent the combination of the "noise equations" and GMDH can tolerate and eliminate the effect of noise, if applied to problems of "complexification", talked about by Santa-Fee Institute, USA. Among the several sorts of "complexification", the mathematical "chaos" (non-linearity) is the most essential.

1.7 Apply the computational mechanism of the "noise equations", GMDH, and the aforementioned neural network model of Newton's third law to some practical problems.

1.7.1 Apply the computational mechanism of the "noise equations", GMDH, and the aforementioned neural network model of Newton's third law to some psychological problem to see by simulation if a creation of substances that promote the formation of "objective" and "will" in the neural network, can be self-organized.

1.7.2 In former times, old persons were symbols of sages. At least, more than 80 years ago, old persons were far more hale and hearty. Today in the world, Japan is the number one country where the percentage of persons who suffer from senile or even middle-aged dementia (Alzheimer's disease) is the highest. On the other hand, Japan with such a small inhabited area (71% of such a small surface 370,000 squared kilometers is mountains. The remaining only 29% is occupied by the population of 125,000,000) but with so many cars and motorcycles is the number one country, where the produced volume of exhaust gas from vehicles is the largest and the concentration of exhaust gas is the highest in the world. Some hypothesize that there would be some "correlation" between the two facts, but nobody has ever seriously analyzed the problem, even using the statistical "correlation". As the exhaust gas of vehicles contains lots of endocrine disrupters (reducing the number of leucocyte by 25% for the last 15 years, for instance) and deadly poisons like toluene, xylene, and formalin, I plan to apply GMDH to analyze in order to see if there is a causality chaining from the air pollution by

exhaust gas of vehicles toward the dementia. Later, from the constructed GMDH network, make further research to find out biochemical & biophysical action/reaction chaining.

1.8   Based on the "noise equations", the modified GMDH, and the Neural Network model of Newton's third law, create a new learning computer architecture capable of efficiently computing and simulating real anti-entropy processes.

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