

Cosmological Term of Einstein Equation and Dark Energy Elucidated by Energy Body Theory

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1. Abstract

Dark matter and the dark energy are the biggest mystery for physics. But those characters are already elucidated by the energy body theory. The cosmological term in the Einstein field equations is “the universal repulsion” which becomes negative energy. Einstein supposed the regular Universe. It was very natural because of “the conservation law of energy”. But it looks like the universe expansion broke “the conservation law of energy” Also, in “energy body theory” the dark energy is negative energy too. It is the same as “the universal repulsion”. “The conservation law of energy” is endorsed by the Universe circulation system which is introduced by the energy body theory. After all, the universe is the regular Universe. The energy body theory describes that everything in the universe is energy body and all of phenomena in the Universe are caused by trying to balance the different energy level between two energy body systems. Energy body is comprised of energy cell bodies which are extremely smaller than elementary particles. Gravitational field is comprised of space layers where energy cell bodies are arranged on the spherical face. Dark matter is gravitational field. The dark energy is that expanded energy cell bodies are spread out around gravitational field. Dark energy is generated with a gravitational field as a pair. Elementary particles are the excitation states of energy cell bodies. Specifically, elementary particles are the states that energy cell bodies are shrinking, expanding, and more rotating.

2. Outline.

Dark matter and the dark energy are the biggest mystery for physics. But those characters are already elucidated by the energy body theory. To derive the regular Universe, Einstein added cosmological term in the Einstein field equations. That reason is because he noticed that the universe would shrink by the influence of gravity if general theory of relativity is applied to the Universe, So, he introduced “the universal repulsion” which made the cosmological constant positive a little. This is important point. In other words, the cosmological constant as the repulsive force against gravity to make balance was needed. It is particularly important for "gravity" and "the universal repulsion" to exist as a pair. Both is not chipped. You might think that “the Universal repulsion” is positive energy. But if gravity is put positive energy, “the universal repulsion” becomes negative energy.

Also, in “energy body theory”, gravity is positive energy and the dark energy is negative energy too. When gravitational field is formed, the dark energy field is inevitably generated

as its set outside of gravitational field. This was given light on by energy body theory introducing new concept of space. Or the space composed of energy cell bodies which are like micro bubbles of Planck scale-length. The space where energy cell bodies are arranged on the spherical surfaces and they are piling in layers focusing on one point is gravitational field. There is almost no distortion of energy cell bodies microscopically, but macroscopically, the distortion of energy cell bodies appears on a whole spherical surface. The energy cell bodies located at the outside of the shrunk energy cell bodies which are arranged on the spherical surfaces are swelled. This field where energy cell bodies are swelled is the dark energy field. In other words, the dark energy field is inevitably generated with the gravitational field at its outside. Then when plural gravitational fields are generated, what happens to each dark energy field generated as a pair? The principle of superposition acts on plural gravitational fields. Because gravitational field is composed of shrunken energy cell bodies and is concentrated. Therefore, after gravitational field was generated around an object (a star), it is subordinated to the object and is an independent system. But dark energy is composed of the swelled and spread energy cell bodies. Therefore, while respective gravitational fields exist independently, dark energy fields are aggregated into one. As a result, the dark energy is one system in the whole universe. This is the dark energy field.

The reason why each galaxy shifts away from each other in an isotropic manner because gravitational fields in higher energy try to shift to the dark energy field in lower energy. Thus, the cosmological term of gravitational equation in the theory of relativity and the dark energy field in the energy body theory are common to the point that the gravitational field and the dark energy field is generated and exists in a pair. As a result, it is known that the universe is finite and in steady state in the way Einstein stuck to. The dark energy by the energy body theory explains why galaxies go away from each other in an isotropic manner with accelerating speed. More, the energy body theory proposes the Universe circulation system. Galaxies are generated around the center of the Universe, and are attracted by the dark energy, and travel to the edge of the Universe. So, galaxies dissolve emitting fudge energy there and cause the space background radiation. On the other hand, the released energy makes pressure to around the center of the Universe and cause newborn galaxies. I call this circulation of magnificent energy "the Universe circulation system". This thing shows that the Universe is finite theoretically. There is neither beginning nor ending of the Universe. There is only space forever, or only energy body. The observatory-results like discoveries like huge, matured galaxies in the far Universe or new galaxies near the earth reinforce the Universe circulation system.

3. The Einstein field equations.

The cosmological term was not included in the first Einstein field theory which was announced in 1916. But the cosmological term has been added to the Einstein equation in the thesis that was announced in 1917. Einstein regarded the size of the Universe as something invariable. But he noticed if the general theory of relativity is applied to the Universe, the universe will shrink by the influence of gravity. So, he made the Universe model (the Einstein's stationary Universe model) with finite volume by adopting the cosmological constant in the Einstein field equation for the Universe not to vary with time passing

But there are many unknown things about the size of the Universe like the questions if the universe is limited, or if the space is warped to be linked, so have no edge. More, the Einstein's stationary universe model is unsteady one which is expanded or shrined by a little shake. The cosmological term is described as follows in the Einstein field equations.

Gravitational equation (or Einstein equation)

$$G_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

added cosmological term $\Lambda g_{\mu\nu}$ is

$$G_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

In the cosmological term $\Lambda g_{\mu\nu}$, Λ is called cosmological constant which is scalar quantity not existing in the coordinate system. It expresses repulsive force ($\Lambda > 0$) or attractive force ($\Lambda < 0$) of space-time and is usually a little positive.

The left side is geometric quantity and expresses how space time is distorted (curvature of space-time). The right side is quantity to show the distribution of matter field.

Roughly speaking, if you substitute matter like a star or energy for the right side, you can read how space-time around the matter is distorted.

The left side $G_{\mu\nu}$ is Einstein tensor which express the geometrical structure of space-time.

$G_{\mu\nu}$ is used by ricci tensor $R_{\mu\nu}$ and metric tensor $g_{\mu\nu}$ multiplied by scalar curvature (ricci scalar) R

$$G_{\mu\nu} = R_{\mu\nu} - \frac{1}{2} R g_{\mu\nu}$$

then,

$$R_{\mu\nu} - \frac{1}{2} R g_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu}$$

is introduced.

It shows that the right side is $\frac{8\pi G}{c^4}$ times of energy-momentum tensor $T_{\mu\nu}$.

4. The dark energy.

It was revealed in 1920 's that the Universe was expanding by the observation of Edwin Hubble and others. As Einstein knew that, he regretted doing the worst failure in his life.

But it has been revealed in recent years that the universe is now expanding with accelerating speed by the observation of far distant supernovas, the cosmic microwave background (the cosmic background radiation) etc. And the existence of the cosmological term is bolstered as a mechanism to explain accelerating expanding of the Universe.

Hubble found in 1929 that galaxies were moving away in an isotropic manner from the Earth at velocities proportional to their distance. George Gamow advocated and developed the big-bang theory in 1940 's, but researchers were skeptical. In 1964, as the cosmic microwave background was found, the big-bang theory became the mainstream. But Big Bang model had problems like " the horizon problem" and "the flatness problem" etc. In 1981, the cosmic Inflation model which is a theory of exponential expansion of the universe in the early Universe was advocated by Katsuhiko Sato and Alan Guth. This theory is the strongest one which can explain the unnatural early stage condition as "the horizon problem" and " the flatness problem" of the standard big bang model of the Universe. But some problems are also left in the inflation model, for example" magnetic mono pole (note 1)", " asymmetry of baryons (note 2)", "the age of globular clusters" and "the discovery of Himiko". The "galaxy (HSC J1631+4426) which has been just announced from National Astronomical Observatory of Japan on August 1 of this year (2020) would also come into problems of the big-bang theory. The "galaxy (HSC J1631+4426) is located 430 million light-years away from the earth. Only about 10 million years have passed since this galaxy was formed.

The dark energy causes accelerating expanding. The cosmological constant is a special dark energy which does not change its values through the Big Ban process. There are no contradictions if we assume that the dark energy is the cosmological constant up to the present observations. Then what the identity of the dark energy is? The only candidate considered at present is the vacuum energy. But the vacuum energy densities as a candidate for the dark energy are presumed as far much (123 square times of 10) as the value observed at the quantum field. Therefore, the vacuum energy will not be a candidate for the dark energy. The origin of the cosmological constant is thoroughly unidentified. Further, today the present constitution of the Universe is presumed that ordinary object accounts for only 4.9% of the contents of the Universe, the dark object accounts for 26.8%, the dark energy accounts for 68.3%.

The above is the situation for physics concerning the Einstein Equation until today. But I already elucidated what the dark energy is and knew what the structure of the universe is. Then, from my point of view, physics looks like the airship wandering around a high rising

opaque glass wall, though having near misses to the core of origin. The wall is not thick.

(Note) **1. Magnetic monopole problem:** The existence of a magnetic monopole is predicted by the gauge theories which is the Standard Model of particle physics. But It has not been found in the real world. But this problem does not exist in an elementary particle model of the energy body theory. Because a pair of electrons which one is front side and the other is back side form a magnetic dipole.

(Note) **2. Asymmetric problem of a baryon:** Though particles and antiparticles should have been generated as pair, antiparticles of baryon almost lurks in the real world.

But this problem does not exist in an elementary particle model of the energy body theory. Because an antiparticle is the back side of itself. But, the mystery that the most particles are the front side remains.

5. Cosmological constant.

Again, let us return to the Einstein Equation and see the cosmological constant. The macroscopic property of the material is characterized by its energy densities ρ and pressure p . The cosmological constant is based on a strange state equation as $p = -\rho$. The dark energy which is generalized it is parameterized by the state equation with the negative pressure $p = w\rho$ as phenomenology. In other words, the negative pressure is the energy component existing regardless of the Universe expansion. And the negative pressure is gas tensile strength that the energy component produces. The dark energy is marvelous energy. The pressure of the dark energy does never change even if the volume of the Universe change. Its feature is taken up in the next. You might feel too hard to understand it. But the energy body theory cleared these features, therefore the dark energy is elucidated.

Character of Cosmological Constant in Einstein Equation

- ★ The cosmological constant in Einstein equation is not in contradiction with the dark energy at present.
- ★ The cosmological constant is the energy of uniform density existing in the whole Universe.
- ★ The cosmological constant is negative energy. It is important especially that the cosmological constant is the energy adopted from the necessity against the Universe shrinkage because of gravity. (In the energy body theory, the dark energy is generated in pairs with gravity.)

- ★ The cosmological constant exists regardless of expansion or shrinkage of the universe.
- ★ The relationship between dark energy and inflation is not clear.
- ★ If the cosmological constant is assumed as the energy of the vacuum and as its energy density is equal to the energy density of quantum field, the difference of a 123 digit number is showed up by observation.(flatness problem)
- ☆ The energy density early after the time when the Universe came into existence is
 $\epsilon_p = 3 \times 10^{133} \text{ eV}/m^3$
- ☆ The critical energy density of the Universe is $\epsilon_c = 4.8 \times 10^9 \text{ eV}/m^3$

6. Energy body theory.

6.1. Outline of Energy body theory.

I would like to explain the energy body theory in brief, before describing a pair of gravity and the dark energy by the energy body theory,

If the energy body theory is stated in the fewest words, it seems to be the next. "The cause of all physical phenomena in the Universe is that a system of energy body tries to shift its energy to the other one to balance the different energy density between both systems of energy body." This sentence may be too simple to comprehensive. But if you read this sentence again after you understand all sections in energy body theory, you will consent that this sentence would express all physical phenomena in the Universe. This is the fundamental principle of the Universe that the energy body theory uncovered. The next is the axiom of the energy body theory which was published by my blog on August 31 in 2015.

Energy Body Theory Axiom

1. All existences and phenomena in the Universe consist of the only one element (It is called energy body.). The Universe and elemental particles are both the same energy body.
2. Energy body consists of the organization which is quite smaller than elemental particles (It is called energy cell bodies.) and are vibrating. This vibration is perceived as energy.
3. All reciprocal actions are caused by the different energy levels among the systems of energy body.

Here in after It is being explained a little more specifically.

There is a must to consider the Universe expansion., That is the problem how to recognize the Universal space. Today physicists do not think the vacuum space is just a spatial expanse. They think that elemental particles and antiparticles are generated and annihilated in a pair from the vacuum space in the quantum field theory. They recognize that the Universe itself is expanding by the Big-Bang theory. It used to be thought that the Universe was filled with ether by classical physics, though it is denied at present. It is because light propagates in the vacuum space and remote force like electromagnetic force acts too.

Modern physics describes the force which acts between spatially distant two particles by the quantum field theory. The quantum field theory describes that remote forces interact with physical fields like electromagnetic field, gravitational field and let the fields fluctuate. By that remote forces propagates. There are 4 fundamental forces of nature, electromagnetic force, strong force, weak force, and gravity. The theory which unifies fundamental forces by field theory is called "a unified field theory". The theory which unifies 4 fundamental forces of nature, electromagnetic force, strong force, weak force, and gravity is called "a theory of everything". It is thought that a candidate for a theory of everything is only superstring theory at present. In other words, the space itself contains energy and behave like a spring or an elastic body at the place like an electromagnetic field where field force act. Energy exists in the space with field force. This is called a vacuum energy. In quantum mechanics, the lowest possible energy state of a field fluctuates and appears as virtual particles, which are always created and annihilate in particle-antiparticle pairs. This vacuum energy is considered to become a motive force of cosmic inflation in the early universe. But there are a lot of questions as it was stated first. And the dark energy is a mysterious energy. And the theory of everything does not include the dark energy.

I paid attention to the space and presumed that the space itself caused physical phenomena. In other words, the space is a physical materiality, also field and elementary particles are the space. I decided to call the space "energy body" from this viewpoint. But if an elementary particle is a part of the space, you must think that objects (elemental particles) cannot move. For the response, I offer a counterargument as follows. Elementary particles (objects) are the excitation of the local space, so the movement of an object is the same as the transference of the excitation of local space. More, you might not think that origins of the mass can also be explained. Because in the gauge theories the Higgs mechanism causes bosons have mass. But I also explain about this as follows. Why an object (elementary particles) as spatial excitation move is because an object (elementary particles) is dragged by the undulation occurred in front of the object (elementary particles). The undulation is a kinetic energy of the object. The kinetic energy is added to the static energy of the object as mass. The magnitude of the

undulation is proportional to the mass of an object. And when a kinetic energy is detached from an elementary particle, it will be a photon. A photon is regarded as an elementary particle which mediates force by gauge theory, but I do not think it is appropriate to classify a photon into one of elementary particles. A photon is a wave motion which does not accompany with a kinetic energy.

Then what mechanism the space is made of? The space is excited there, and durations are caused. Well, the space consists of an organization, which is like tiny bubbles and quite smaller than elementary particles. This organization is called energy cell bodies. Energy cell bodies freely transform expanding or shrinking at the velocity of light. Expansion of energy cell bodies occurs inevitably with shrinkage of the other energy cell bodies for a pair. It is because a gap does not occur in the space, if only one occurs. These expanding and shrinking of energy cell bodies are the origin of energy and are the root of the law of the conservation of energy. And the theory of everything unifies four fundamental forces of nature, electromagnetic force, strong force, weak force, and gravitational force, in addition to these four, the dark energy and the dark matter are also unified by expansion and shrinkage of energy cell bodies,

6.2 Master person of spatial consideration.

There were two pioneers who considered space with revolutionary ideas. Coincidentally, both people lived almost at the same time. They are Genius Einstein and Yukawa Hideki. Einstein announced the theory of relativity by geometrical consideration about space and showed the distortion of space-time. After Hideki Yukawa contributed to a theory of elementary particles by theoretical expectation of a π meson, kept deeply studying from a theory of nonlocal fields to a theory of elementary domain. The next sentences indicate the essential points of two theories.

Theory of relativity: Gravitational field is the distortion of the space-time. Inertia force is frame-dragging.

Theory of elementary domain: Space consists of elementary domains which is not impossible to be divided into more minute. Elementary particles are excited states of local elementary domains. Movement of elementary particles is transition of excitation of elementary domains.

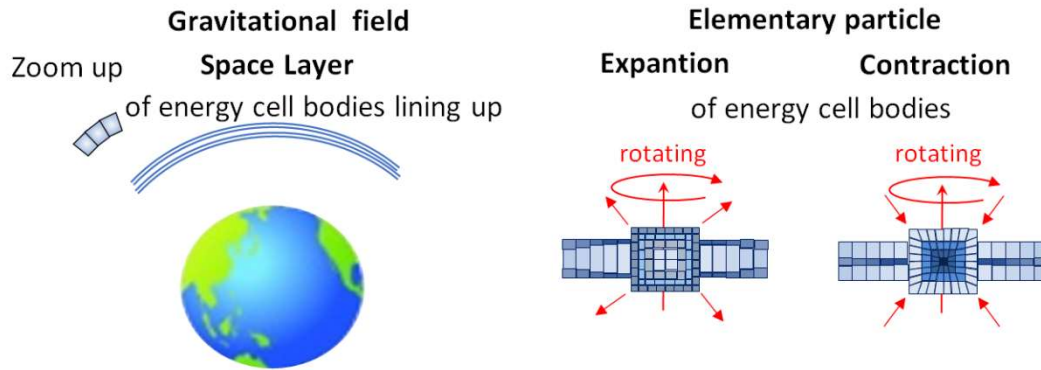
The energy body theory is located on the prolongation of the theory of relativity and the theory of elementary domain. Space consists of energy cell bodies and is not impossible to be divided into more minute ones. Elementary particles are the space vibration in a focal manner, while energy cell bodies are expanding and shrinking and rotating on its axis. Energy cell

bodies are equivalent to the elementary domain in the theory of elementary domain. Therefore, when expansion and shrinkage of energy cell bodies rotating on a self- axis transit, it is the same phenomena that elementary particles travel. It is like a Typhoon travelling. Elementary particles do not move by its energy itself, but move being dragged by undulations formed in front of elementary particles. In other words, kinetic energy is undulations which has occurred in front of particles. If kinetic energies of undulations are detached from elementary particles, kinetic energies become photons. Photons are the immediately preceding undulation of kinetic energies which were detached from elementary particles. The interactions of elementary particles with each other are caused by energy rising or down by each rotating waves' direction between elementary particles.

Gravitational field is composed of space layers with energy cell bodies arranged in rows on the spherical surface around a star. This is the cause of the distortion of space-time by the theory of relativity. When elementary particles enter gravitational field, energy cell bodies which form space layers of a gravitational field synchronize with expanding, shrinking, and rotating and act as elementary particles. The energy of an inside space layer is smaller than outside one. Then, the energy of energy body exciting as an elementary particle tries to shift more inside space layer to compensate for the energy difference. This is gravity. More, by this you know the energy density in a gravitational field is bigger. So, if light enters in a gravitational field, it refracts along space layers. It is the same principle as when light enters water, it refracts. And if light refracts, light velocity becomes slower and time becomes longer. This is the space-time distortion.

The left side in figure 1 shows that energy cell bodies of a cube shape (temporary) in space layers are distorted on the spherical surface, The right side in figure 1 shows that energy cell bodies form elementary particles expanding and shrinking focusing on one point and rotating on a self-axis. We can see that the distortion rate of one energy cell body is ridiculously small in gravitational field. Compared that, we see that the distortion rate of one energy cell body of an elementary particle is excessively bigger.

Energy Body Theory



A point in common with gravitational field and elementary particles is distortion of energy cell bodies.

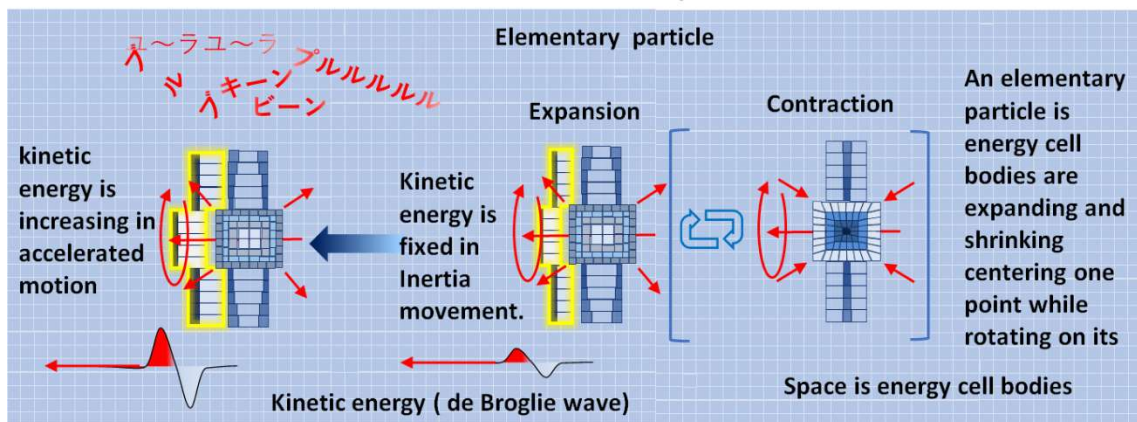
Einstein said "Gravity is distortion of space-time".
In energy body theory, it is space layers that energy cell bodies are lining up on the spherical surface.

Hideki Yukawa said "an elementary particle is exciting state of local spce".
In energy body theory, it is that energy cell bodies are expanding and shrinking centering one point while rotating on its axis as undulation.

Fig.1

Expansion and shrinkage of energy cell bodies which occurred in front of an elementary particle travel as an undulation. That is kinetic energy. Figure 2 shows that an elementary particle travels being dragged by the undulation. The front part of the undulation is in high energy level, the other hand the back part of the undulation is in low energy level. The elementary particle is dragged by the back part in low energy of the undulation.

Motion of an elementary Particle



Energy cell bodies are distorted instantaneously and freely. so expanding or contracting.
Motion of an elementary particle is to transit energy density of local energy cell bodies.

Fig.2

The undulation occurred in energy body in front of an elementary particle is kinetic energy. When an electron transition is occurred, bright line spectrums are observed. After an electron on the orbit of excited states transits to the orbit of ground states being dragged by an undulation, the undulation detaches from the electron, and becomes a photon. Then, the energy of an electron transition is equivalent to the energy of the photon emitted from the electron. By this, the velocity of a photon is introduced as follows.

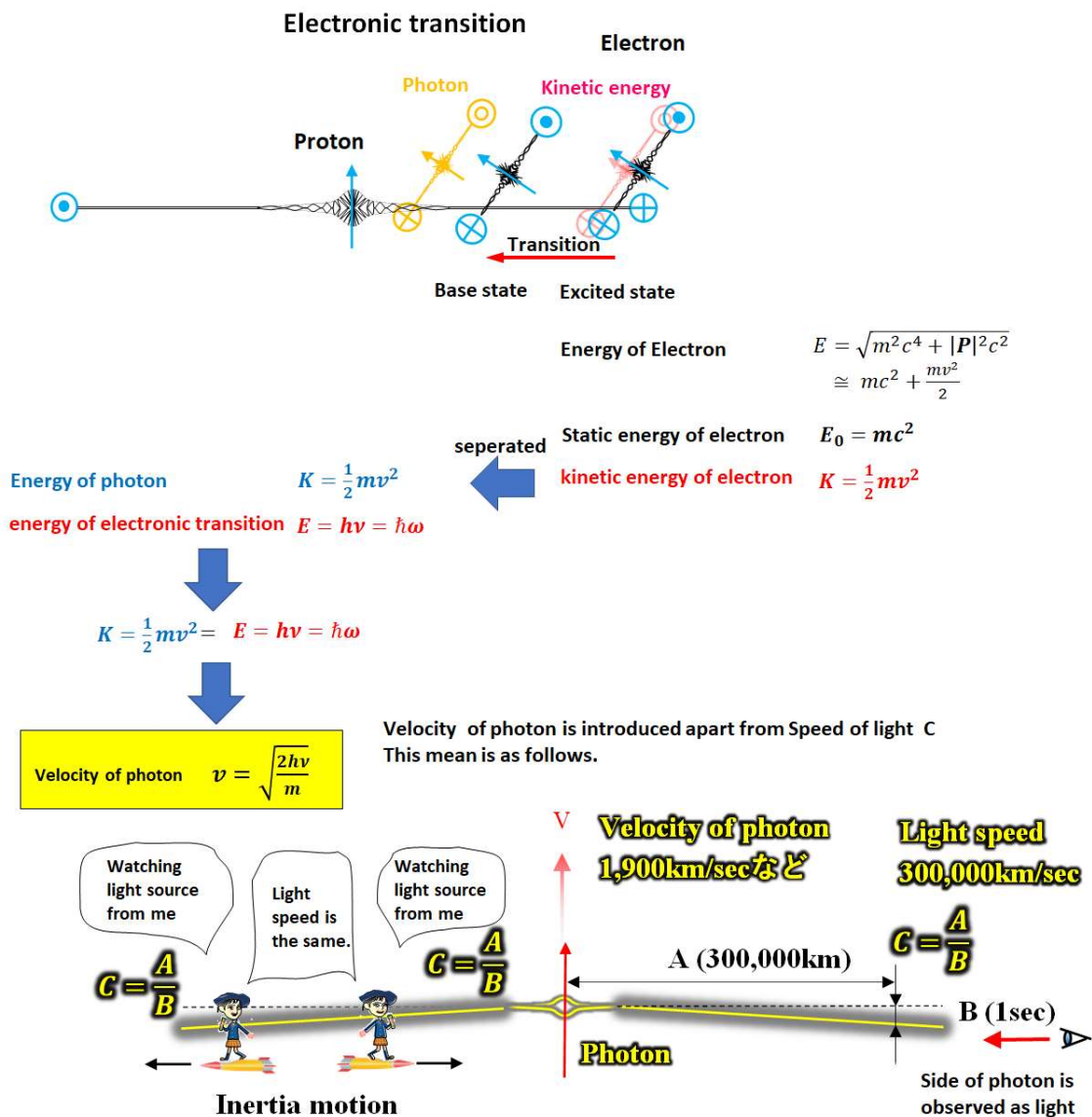


Fig.3

6.3 Energy

Energy cell bodies receive energy from adjacent energy cell bodies expanded, or transfer energy to energy cell bodies shrunk, and deform immediately at light speed. Because energy

cell bodies form the space, they cannot make a gap between them. So, when some energy cell bodies expand, shrink, or distort, the adjacent energy cell bodies do the opposite actions. This is the origin of energy. And This is the root of the law of the conservation of energy. In reality, expanding, shrinking, and deforming of energy cell bodies occur by a unit of energy cell bodies' group, (which is called a system,) and try to stabilize. Therefore, the system in high energy density try to transfer energy to the system in low energy density. This transference of energy between systems of energy body appears as phenomena of an attractive force and a repulsive force.

Change of volume of an energy cell body and restoring force

Restoring force is proportional to a change of the volume of an energy cell body. This restoring force is the energy. Therefore the energy is proportional to the volume of an energy cell body. Restoring force per the unit volume is called an energy density.

1. High energy density: Shrinkage of an energy cell body (volume decrease)

2. Low energy density: Expansion of energy cell body (volume increase)

3. Difference of restoring force:

High energy density: Energy moves outside.

Low energy density: Energy enters inside.

7. Elementary particles.

Elementary particles are the state that the local field in the space excited. Energy, which is made from shrank energy cell bodies, is unevenly contributed in the space, so pressure is added to the spatial one point from the entire sky. As a result, a group of the local energy cell bodies becomes in a high compression state. Then energy cell bodies begin to expand and shrink in a radial pattern, and vibration starts. This is the same principle as of elongation and contraction of rubber or spring vibration. But the pressure needs to be removed in a moment for vibrations to begin. Is there any way to be realized? It is the spin. A part of the pressure added to a group of energy cell bodies beyond the compression limit shifts in the direction of rotation in a moment, so a group of energy cell bodies expands because of the removal of pressure. Therefore "An elementary particle is a rotating undulation while a group of energy cell bodies expanding and shrinking in a radial pattern. The shape of an elementary particle is spherical at the rotating center and spreads widely at the skirt around the spherical part into the space. Therefore, the direction of the vibration expanding and shrinking at the skirt slips out of the spherical center and the shape of the skirt is thin and plane. The figure 4 is the elementary particle model. The spherical part in the center of an electron shows the character

of a particle, and the skirt part shows the character of an electromagnetic field. Elementary particles are described from here for your better understanding what mechanism works among gravity, the dark energy, and elementary particles. I would like to explain about electromagnetic force, strong force, weak force, spin, and photons, but I cannot, because it will be needed long time to explain them. Just it is needed for you to understand that elementary particles, gravity, and the dark energy are the phenomena that occur on the common base of energy cell bodies expanding and shrinking. Interactions among elementary particles, gravity, or the dark are caused from the restoring force of energy cell bodies.

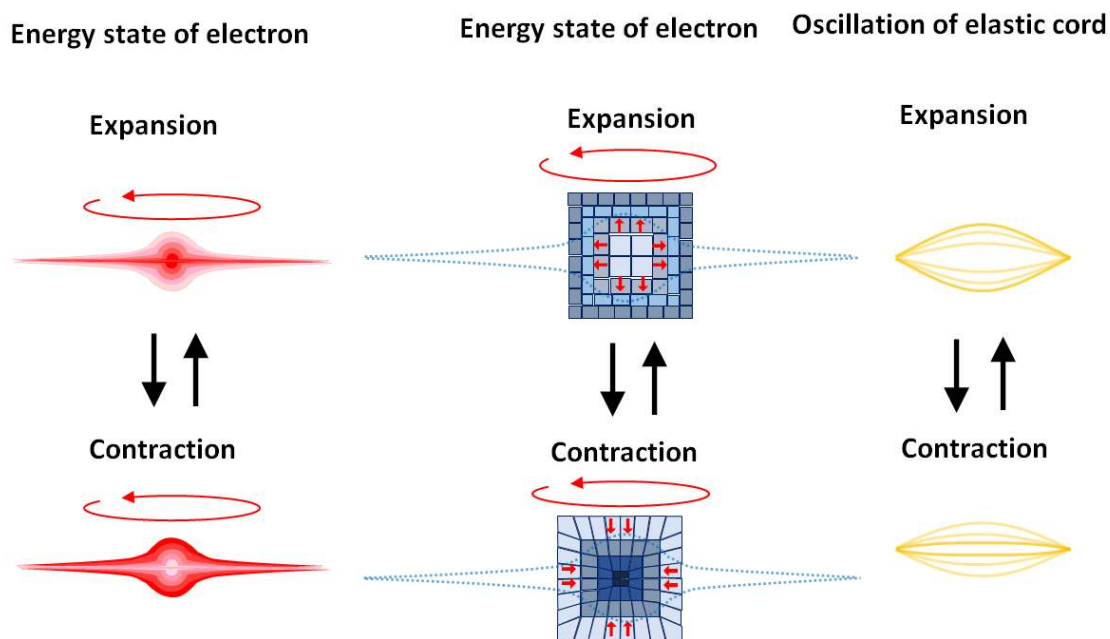


Fig.4

8. Gravity and the dark energy

8.1. Outline.

It is necessary to combine gravity and the dark energy to reveal the dark energy. The reason is because I found that the dark energy is generated in a pair with gravity, on the process to study the mechanism of gravity generation by energy body theory. But it was natural for me to think that gravity and the dark energy were generated in a pair at that time. If gravitational field has positive energy, something must have negative energy equivalent to positive energy. As energy is restoring force of the expanding and shrinking energy cell bodies which compose the space in energy body theory, then the energy conservation law is a truism to stand up in the whole universe. But when it will be the universe, the energy conservation law is ignored.

After Einstein field equations was announced, it was wise that he noticed the fact and added the cosmological constant. But I heard that Einstein had regretted adding the cosmological constant to the Einstein equation after the observation that galaxies go away from each other in an isotropic manner. The universe confuses even a super-genius. According to the release from the European-led research team behind the Planck cosmology probe 2013, it is theorized the Universe contains 4.9% ordinary object like atoms, 26.8% dark matter and 68.3% dark energy. (Dark energy: Wikipedia) It is natural that the Universe contains more dark energy if it is theorized by the cosmic inflation. But the rate of energy occupied by the dark energy in the whole universe must be 50% by the energy conservation law. The energy body theory expects the rate is 50%. As objects and gravitational field, which is dark matter, are occurred in a pair of the dark energy field, so object and dark matter, and the dark energy occupy 50% each of the whole Universe. It indicates the steady state cosmology, because positive energy is equivalent to negative energy in the whole Universe. Also, the spatial size of the entire universe is unknown, but limited. But then how should I interpret the fact that galaxies go away from each other in an isotropic manner? The energy body theory responds to the question by explaining generation mechanism of objects, gravity, and the dark energy. Objects and gravitational fields are in high energy states of energy body. On the other hand, the dark energy field is in low energy states of energy body. Therefore, objects and gravitational fields of high energy states are attracted to the dark energy of low energy states. And they arrive at the edge of the universe and release their energy and begin to melt. Specifically, the shrunk energy cell bodies hand their energy to the dark energy field.

And after the energy melt out at the edge of the Universe turns to the pressure which makes the universe center be in high energy density. Therefore objects like stars, galaxies are generated around the center of the Universe. This is the Universe circulation system. More objects and gravitational fields are independent systems respectively because a gravitational field is composed of spherical space layers like an onion. On the other hand, the dark energies are not independent system, but is one system in the whole universe, because the dark energies generated from each gravity field of stars are integrated into one. Here is an attention, you must remember that the movement of objects like stars and galaxies are just only transferences of their excited states, which is shrinkage of energy cell bodies,

The composition of the Universe is estimated as 4.9% ordinary object like atoms, 26.8% dark matter and 68.3% dark energy. But I already described that the composition of the Universe must be that 50% is object like atoms and dark matter which are positive energy, and 50% is the dark energy which is negative energy in the energy body theory. In other words, the view of the Universe in the energy body theory is the steady state cosmology. Therefore, the biggest mystery in the inflationary theory (big-bang theory) if there is a first in the

universe” disappears. But there is a mystery why energy is maldistributed in the space model of the energy body theory too. For that, "fluctuation" will be a key word to solve the problem.

8.2. Generation of elementary particles and the dark energy

Have you thought why elementary particles keep being generated in the Universe? Well, the answer is in the figure 5 in that the Universe circulation system is drew by the energy body theory. The energy body theory uncovered the structure of the universe where objects and gravitational fields (dark matter) in high energy states (energy cell bodies shrinkage) exist around the Universe center, and the dark energy field in low energy states (energy cell bodies expansion) spreads from the outside of the gravitational field to the edge of the Universe. The expanded energy cell bodies occur outside of the shrunk energy cell bodies because of the proper of energy cell bodies.

Around the center of the Universe is in high energy states because of objects like stars, and gravitational fields. On the other, around the edge of the Universe is in low energy states. Therefore, stars and gravitational fields travel to the universe edge from the Universe center of high energy states to compensate the different energy level. This is the cause that galaxies go away from each other in an isotropic manner. It is not the expansion of the Universe, so attention is needed. Only the location of stars transfers far away, then this is the reason why stars themselves do not expand. Stars and gravitational fields arrived at the edge of the Universe melt down to match the energy level of the edge of the Universe. The melted energy spreads out widely and becomes the pressure to the Universe center. Therefore, the space around the universe center becomes higher energy level, and stars and gravitational fields are generated. On the other hand, energy level returns to be lower around the edge of the Universe. The Universe circulation system is concluded in this way.

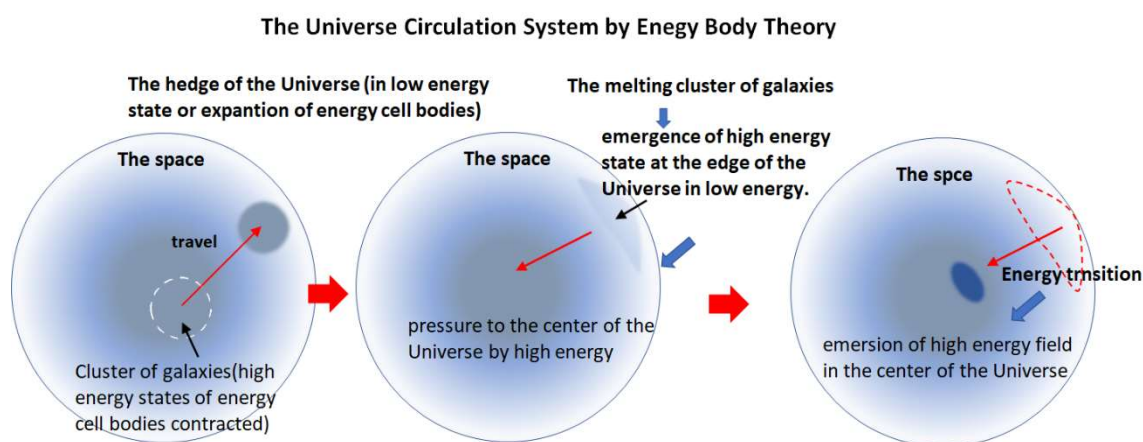


Fig.5

Then, I want to explain elementary particles which are generated around the center of the Universe. I have not found certain answer for the question if gravitational field and the dark energy field are generated at the same time of the generation of elementary particles.

I will simply explain about elementary particles that elementary particles are the excited states of a local field in the space.

For more details, it can be explained that an elementary particle is a group of energy cell bodies which are vibrating by repeating expansion in all directions (entire sky) in a radial manner and shrinkage centering one point, and are rotating on the axis of itself at a local field in the space.

For example, you crunch a resilient rubber and let go your hold in an instant, then the rubber expands, and immediately after shrinks being brought back. If the energy does not go away, these expansions and shrinkages repeat and become oscillations. Until now, I have used a rubber as a metaphor of oscillation of energy cell bodies. But I have found that a spring is used in a field theory. So, I will use a spring in exchange for a rubber. The method of letting go your hold in an instant is the rotation of an elementary particle. When a group of energy cell bodies is compressed toward one-point until the utmost limit, the energy of compression changes to the energy of rotation instantaneously. More, in quantum theory, rotating speed of an infinitesimal particle exceeds light velocity around at its center, then the spin is treated something obscure like a rotation. But it is cleared that the spin is substantial being by the energy body theory. More even if the rotation is at the center of a particle, its speed does not exceed the light velocity. The reason is that the direction of the substantial oscillation is not rotation, but linear between one point and all directions

Figure 6 shows the process of elementary particles being formed. The high energy area occurs in the local space as the density of energy cell bodies fluctuates. And the energy cell bodies in a local space are condensed in the local space and an elementary particle is generated. The newly generated elementary particle is surrounded by energy cell bodies in high energy, and more outside being surrounded by energy cell bodies in low energy. But it is not clear at this stage if the energy cell bodies in high energy surrounding the elementary particle is called a gravitational field, because it is not still certain if the energy cell bodies are arranged in a methodical manner on the spherical surface as space layers. But energy cell bodies in low energy more outside of it might be called the dark energy.

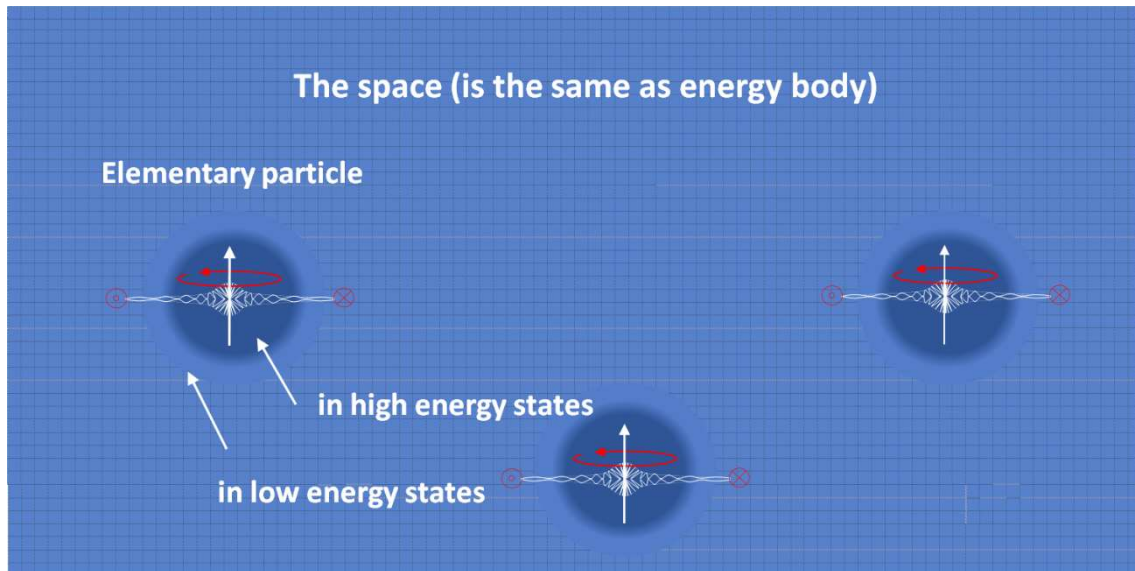


Fig.6

8.3. Generation of Elementary particle, Gravitational field, and the Dark energy

When many elementary particles are generated, the chance to be close with each other is increasing, and they come to combine by electromagnetic force. The skirt part of the rotating undulation of an elementary particle is electromagnetic field. The attractive force or repulsive force work according to each direction of the rotating undulation. Compared with the gravitational field in completed state, the space in the initial state is lower energy states, then the skirt part of undulation of an elementary particle rotating on its axis is not spaciouly spread out. So, it is easier for elementary particles to approach each other. Also, atoms are easily combined. When elementary particles are combined, the energy cell bodies in high energy states surrounding an elementary particle form a lump overlapping, also the energy cell bodies in low energy cell bodies outside of it form a lump making one body, (Fig.7)

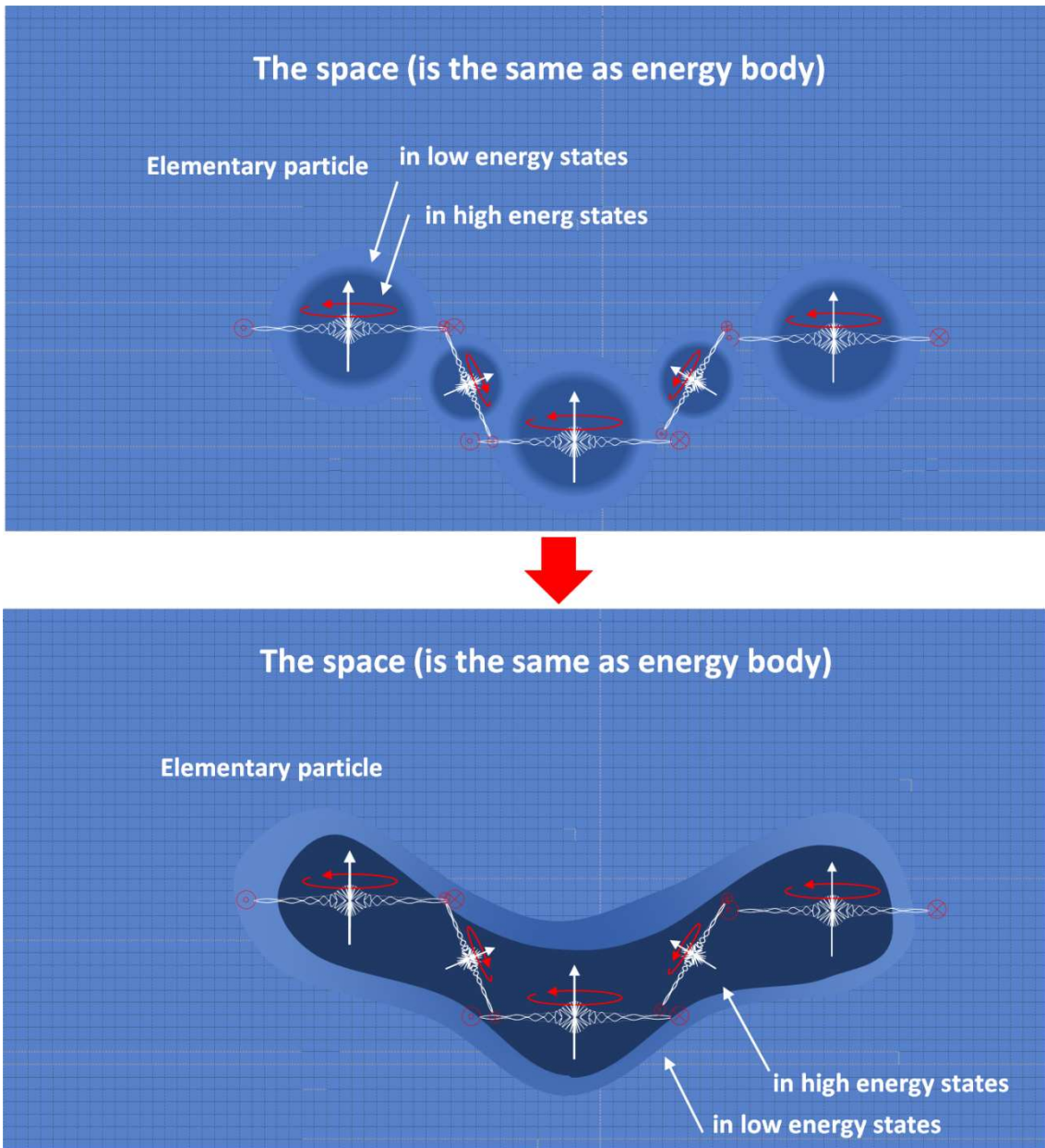


Fig.7

When many more combination of elementary particles developed, an object is formed. And energy cell bodies in high energy states surround the object. And the energy cell bodies in low energy states surround the most outside of it.

The space layer in high energy states and at the outside, the space layer in low energy states are formed repeating.

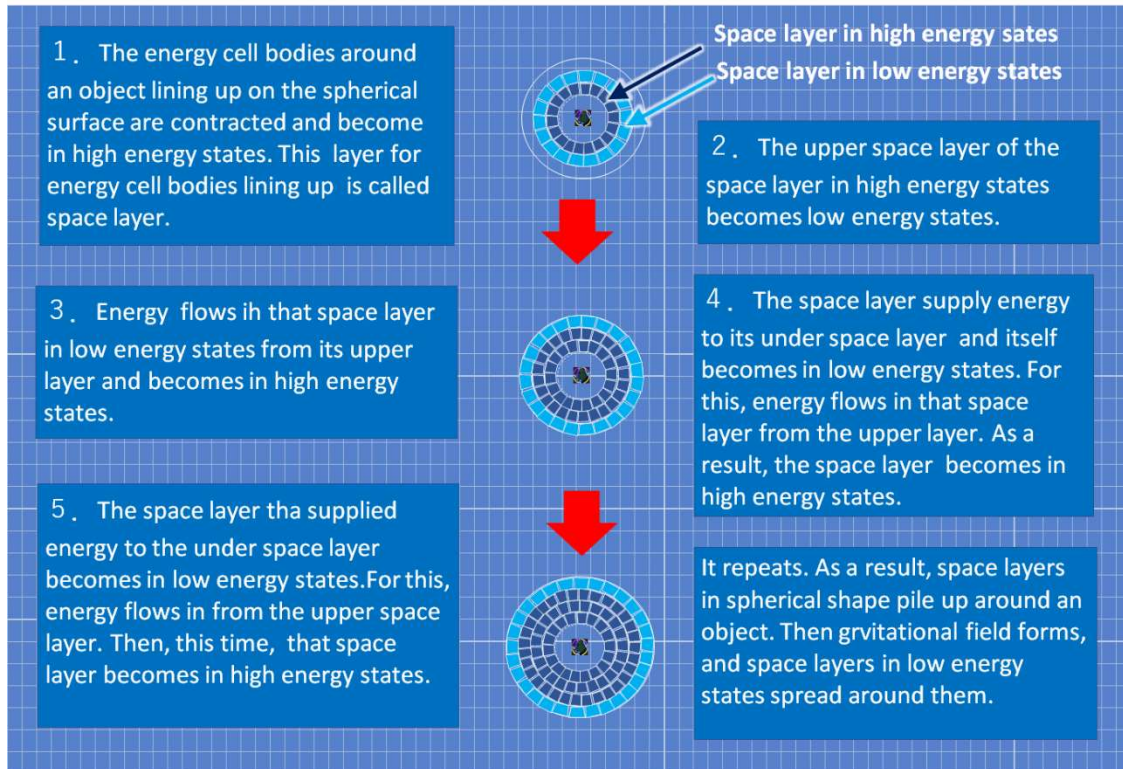


Fig.8

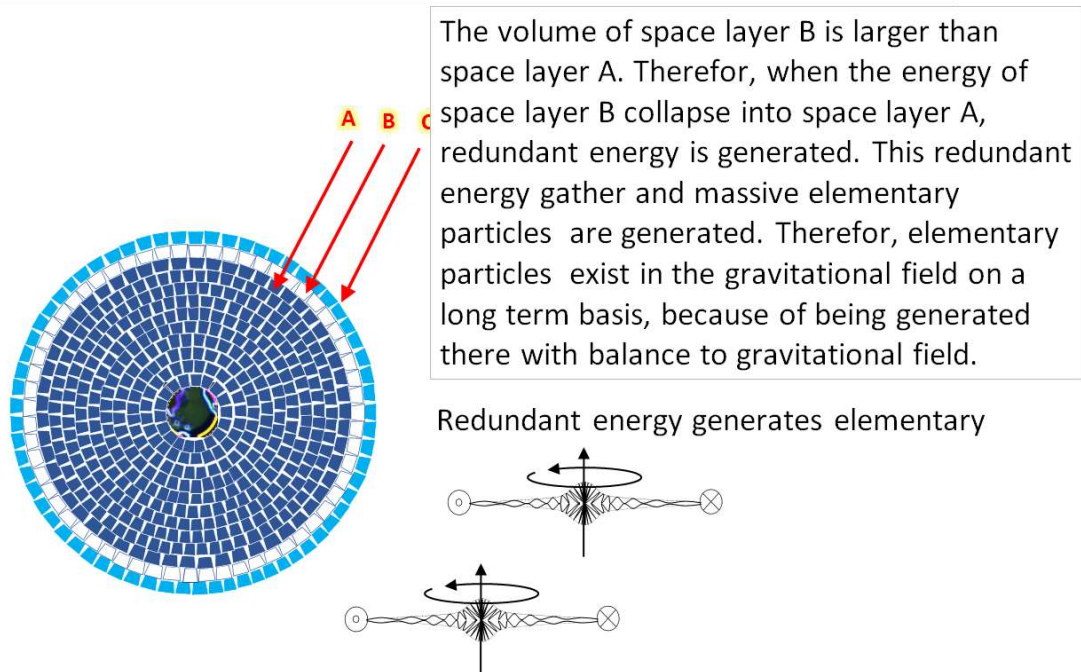
In this way, an elementary particle and an object are formed, and gravitational field, which is composed of space layers piled up (A space layer is composed of energy cell bodies arranged on the spherical surface.) surrounds them. And at the most outside, the dark energy field composed of energy cell bodies which is expanded and in low energy.

The figure 9 shows that countless space layer pile up and spread out, and then form gravity field. And elementary particles are generated by the pressure caused by space layers formation. And stars grow bigger by the elementary particles generated in the space. And space layers grow widely too. Also, the dark energy is formed at the outside of gravity field. The explanation is put in the figure 9.

Formaiton of space layer

The energy of space layer B has just collapsed into space layer A. Then space layer B becomes into low energy state while energy cell bodies are expanding.

For that, next the energy of space layer C collapsed into space layer B.



Redundant energy generates elementary particles. elementary particles conect a matter of a core. Then, a core growth to be a star. Therefore, the difference of energy between space layers is redundant energy to be elementary particles. So, if this redundant energy is integrated, it becomes mass of a star. This idea is very important. because it is ground to introduce gravitational acceleration.

Fig.9

So far, the formation of elementary particles, gravity field, and the dark energy has been explained. And those exist in stable way for along time. The biggest reason about elementary particles is that the whole energy of elementary particles in gravitational field is balanced with the energy of gravity, about gravitational field is that gravitational field is composed of space layers, about the dark energy is that the dark energy is the only one in the whole Universe.

9. The structure of the universe

9.1. The universe circulation system

I explained the formation of elementary particles, gravitational field, and the dark energy in the former chapter. Here, I will explain the structure of the Universe composing of elementary particles, gravitational field, and the dark energy field, from a tiny viewpoint of an elementary particle to a wider perspective of the whole universe.

I already wrote that elementary particles are generated by the space in high energy states locally. When countless elementary particles are generated, elementary particles easily approach each other. And elementary particles combine when the rotating undulation of each elementary particle moves in the same direction. The energy density of the space is not so high at the initial stage of the formation of gravitational field. Then the expanse of the skirt area of an elementary particle's rotating undulation is small. Apart from the combine of an electron and a positron, elementary particles are easy to combine. The upper side on the left in figure 10.

When the combine of elementary particles develops and forms an object, the space layers in high energy states are made around the object. And energy cell bodies are arranged on the spherical surface of space layers. And outside, the space layer in low energy states surrounds. Coming to this stage, the space layer in low energy states is provided energy from the outside space.

Then, an endless chain of collapse of energy begins forming space layers. As energy collapses from outside space layer into inside space layer, redundant energy is generated. And redundant energy creates elementary particles. Newly created elementary particles are attracted by the gravity of an object which begin to act, and the object grows into a huge star. And space layers in high energy states piles up and spreads out around the core of a star, then forms gravity field. More the outside of it, energy cell bodies in low energy states exist. The upper side on the right in figure 10. Gathering of many stars forms a galaxy. At the time, each gravitational field of stars overlaps each other and forms a lump of gravitational field in the whole galaxy.

The dark energies in low energy states surrounding the gravity fields of each star form one body of the dark energy and spreads out the outside of the whole gravity field of the galaxy. Gravitational field overlaps on the other side the dark energy forms on body. This is a big different point.

More, the dark energy formed around the galaxy connects into one body with another dark energies, and spreads over the whole Universe. The underside on the right in figure 10.

As the stars and the gravitational field in a galaxy are in high energy states and the dark energy field is in low energy states gradually diminishing to the edge of the Universe, they

travel to the edge by the difference of energy level. This is the reason galaxies go away from each other in an isotropic manner. More, it is obvious that object, the solar system, and galaxies never expand in an isotropic manner from this reason. In modern cosmic science, it is explained like this “The space itself expands by the Big Ban. It explains the cause that the distance becomes longer between every fixed two points everywhere in our Universe. The system of object integrally restrained, (for example the object restrained by gravity) does not expand along with spacetime inflation.” It is postulated that the physical laws which govern those objects are invariably practical and are unrelated to the measured inflation. Farther, the present cosmic inflation in local scale is microscopic. Then, it is unable to measure it with present technology if the physical laws are governed the cosmic inflation.” (Wikipedia Big Ban interpreted by Ichiro Nakayama) The galaxies and those gravitational field transfer the energy to the dark energy field and melt down. More, large scale structure of the universe is swallowed into the dark energy field keeping as it is and is melt down. For that huge energy is continuously released at every edge of the Universe. And that is the cause of the cosmic background radiation. The released energy at the edge of the universe is become the pressure to the center of the universe and is produced for energy to generate stars. I call this the Universe circulation system.

Almost all researchers were skeptical about the Big Ban theory. But the discovery of the cosmic background radiation changed the situation. But also, the cosmic background radiation is the evidence of the universe circulation system by energy body theory too. It is highly impossible that we live in this era. It is most unlikely for us to live fortunately in this era we can observe the remain of cosmic inflation happened instantaneously by a strange coincidence. The Universe exists from hundreds of billions of years ago and will continue to exist according to the Universe circulation system in energy body theory.

The astrophysics states that anisotropies of the cosmic background radiation caused the large-scale structure of the cosmos. But in energy body theory it is the opposite. It is the cause of the anisotropies of the cosmic background radiation that the whole large-scale structure of the cosmos is swallowed into the dark energy field. Also, you should remember that the travels of galaxies are essentially the travels of the excited states of space, not independent from the space. Because energy cell bodies which compose of the space do never move from the location.

Growth and annihilation of matter, gravitational field, and dark energy

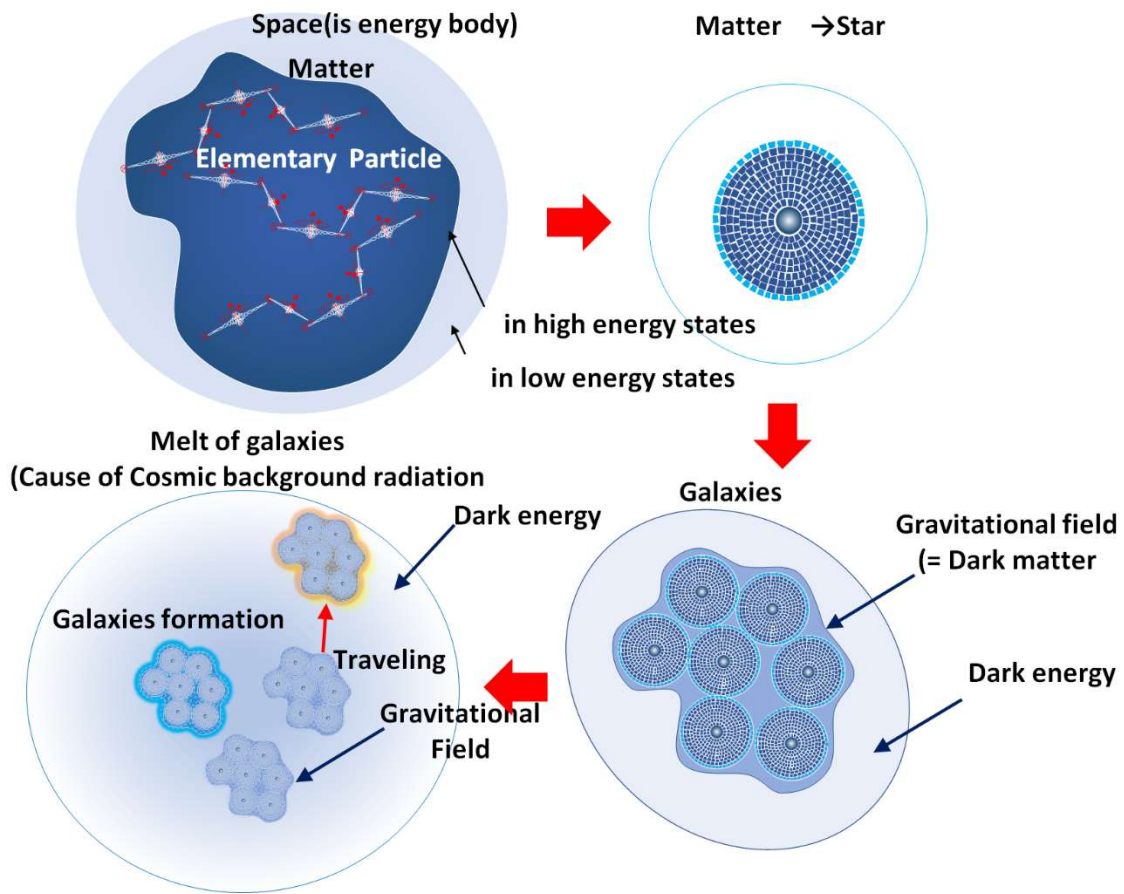


Fig.10

9.2. Dark matter

The energy body theory revealed the mechanism of the Universe, also, the dark energy field is relevant to gravity fields. Then what is the dark matter, which is the other mystery remaining to the universe? I already found what the dark matter is when I revealed the mechanism of generation of gravity field and the dark energy field without my intention. The gravitational field is made of energy cell bodies, which are very smaller than elementary particles and are arranged on the spherical surface. The energy cell bodies arranged on the spherical surface are called space layers. The energy amount of the whole space layer is not so small, but the energy amount of one energy cell body is exceedingly small. Because of lining up on the exceptionally large spherical surface, compressibility of energy cell bodies is ridiculously small. In other word, the energy generated by compressing is almost zero per one energy cell body.

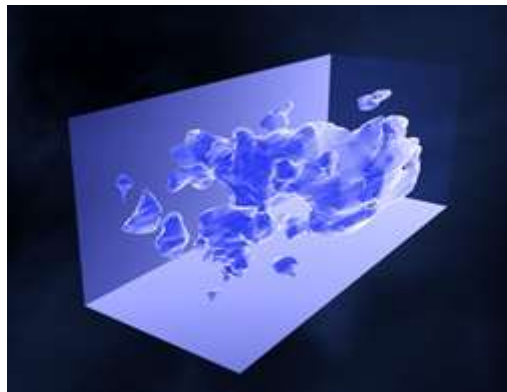
But numbers are force. If a certain size of the spherical surface is picked up, numberless energy cell bodies are included in the area, so gravity acts. It is the reason that only gravity is greatly smaller than the other three fundamental forces. By the way, the space layers are stratified from the center of a star. But space layers do not spread infinitely. There is a limitation. The spherical surface of space layers which is located far from a star is regarded as a plane surface. In other word, a deformation of energy cell body disappears and becomes a standard state. And there is a dark energy field where energy cell bodies are swelled and become in low energy density. Then, the spread of gravitational field has a cutoff point. Suddenly, I want you to remember the structure of a stone bridge. The pressure goes to the inside of a stone bridge, so the stones are rigidly fixed. In the same way of that, the energy cell bodies in the space layers are rigidly fixed. So, the gravitational field is fixed to a star and moves with the star. And many stars gathering form a galaxy, and gravitational fields of individual stars overlap each other. As a result, an aggregation of gravitational fields is formed. This is the reason why dark matter is observed as if it is surrounding a galaxy. As a result, a gravity field is the dark matter itself.

Next sentences are extracted from documents of “JAXA Space Information Center” and “Faculty of Science, Ehime University”

The main character of the Universe is dark matter, which is invisible, but certainly exists there and is the mysterious presence. As dark matter does not emit light nor electromagnetic waves, we can not detect it directly with present way of observation. But the existence of dark matter is presumed by several phenomena. For example, in the case of the mass of a spiral galaxy, it is known that the mass calculated out from the velocity of star’s movement is heavier than that presumed from its luminosity. Also, in the case of the mass of a cluster of galaxies, it is found that the mass calculated out from the velocity of galaxy’s movement is heavier than that presumed from its luminosity. Dark matter plays greater role on the Universe than the objects seen in usual life. The true character of dark matter is mysterious. There were two explanations for that. One is that dark matter is normal object (baryon), but its emitting light and electromagnetic waves are too weak to detect. The other is something like neutrinos which does not interacts with baryon. But by now it is known that the amount of these two candidates does not enough to explain the amount of the existence of dark matter. So, there is a possibility the true character of dark matter is the unknown object. And many researchers are studying. (<http://spaceinfo.jaxa.jp/> JAXA Space Information Center translated by Ichiro Nakayama)

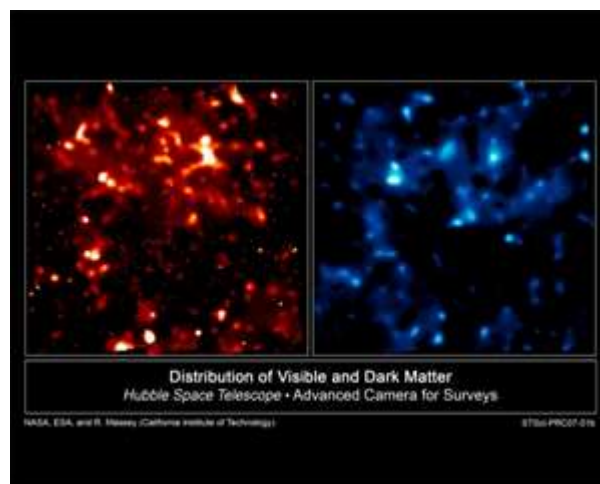
They adopted a program with priority in linkage with COSMOS project and conducted a multi-colored imaging observation at COSMOS field by a principal focus camera in Subaru

Telescope, National Astronomical Observatory of Japan. As a result, they succeed in presuming the distances of about 500,000 galaxies for analysis. If these results are analyzed in corporation with the analytical results of Hubble Space Telescope, the distance of dark matter which causes the phenomenon of a gravitational lens is presumed. By this, three-dimensional space distribution of dark matter (refer fig.11) was revealed for the first time in the world and it was cleared that dark matter forms large scale structure. As this result was compared with three-dimensional space distribution of galaxies, it was found that galaxies are distributed in the large-scale structure made by dark matter. (refer fig.2: This is two-dimensional figure projected on the celestial sphere.) It was objectively verified that galaxies were formed in the large-scale structure which was made by dark matter by this observation.



Three-dimensional structure of dark object around COSMOS sky area. At the front on the left side is the neighborhood space, and going back on the right side the location is far and far. The farthest location at the back is 8 billion light years. You watch the area of 2.7 billion light years square. (Translated by Ichiro Nakayama)

Fig.11



The visible galaxies in the COSMOS sky area (on the left side) and the dark object distribution (on the right side) This image is two-dimensional figure projected on the celestial sphere. Each distribution is very resembling. (COSMOS Press Release Science and Engineering, Ehime University) (Translated by Ichiro Nakayama)

Fig.12

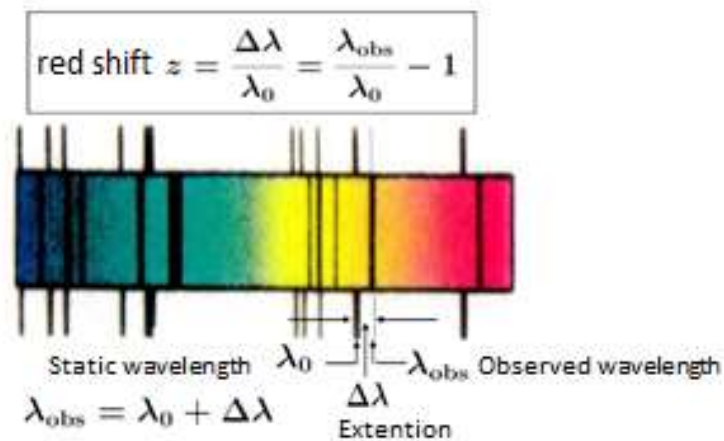
9.3 Cosmic Background Radiation

The cosmic background radiation is an observed phenomenon to prove the big ban theory (or inflation theory), But the cosmic background radiation can also be an evidence to prove the space circulation system. It has been thought that the theory to explain the cosmic background radiation was only the big ban theory. Now the other theory appeared.

The cosmic background radiation is the microwaves which are observed on the celestial sphere in an isotropic manner. The spectrum is the same as the spectrum of light that a black body emits at 3k. The length of an electromagnetic wave from a black body depends on only its temperature. So, the temperature of an object is detected from the length of an electromagnetic wave. In other words, the temperature of the cosmic background radiation arrived at the earth is 3k. But this 3k should be considered affections to the cosmic microwave by cosmological redshift. As the background of inflating space is leaving far from the earth, the wavelength of light emitted there becomes longer.

In standard cosmology, the Universe immediately after Big Ban is in the state of plasma where it was highly temperature and highly density, so electrons and protons were not able to connect. Also, photons strongly interacted with free electrons by Thomson scattering. 380,000 years later, the temperature of the Universe fell, so electrons connected with protons and formed hydrogen atoms. As a result, there were no free electrons in the space. And Thomson scattering became hard to occur and photons came to fly freely in the space. This period is called "clear up of the Universe "(recombination). The temperature of the universe at the recombination was 3,000k. The photons emitted at the time arrived at the earth after 13.8 billion years and are observed now. The wavelength of light was extended to 3k by red shift owing to the expanding universe.

In cosmology, red shift is rather almost used as the red shift parameter z which explains the size of shift than indication of phenomenon. This parameter is defined as the proportion of the extension of wave $\Delta\lambda$ to the static wavelength λ_0 , in the case that the wavelength of a spectral line is observed as λ_{obs} in a laboratory.(refer fig.13) The red shift parameter z is a ruler to measure the distance between celestial bodies, at the same time is a ruler to measure time in the history of the Universe (lookback time or cosmic age). (Astronomical Dictionary, red shift, The Astronomical Society of Japan interpreted by Ichiro Nakayama)

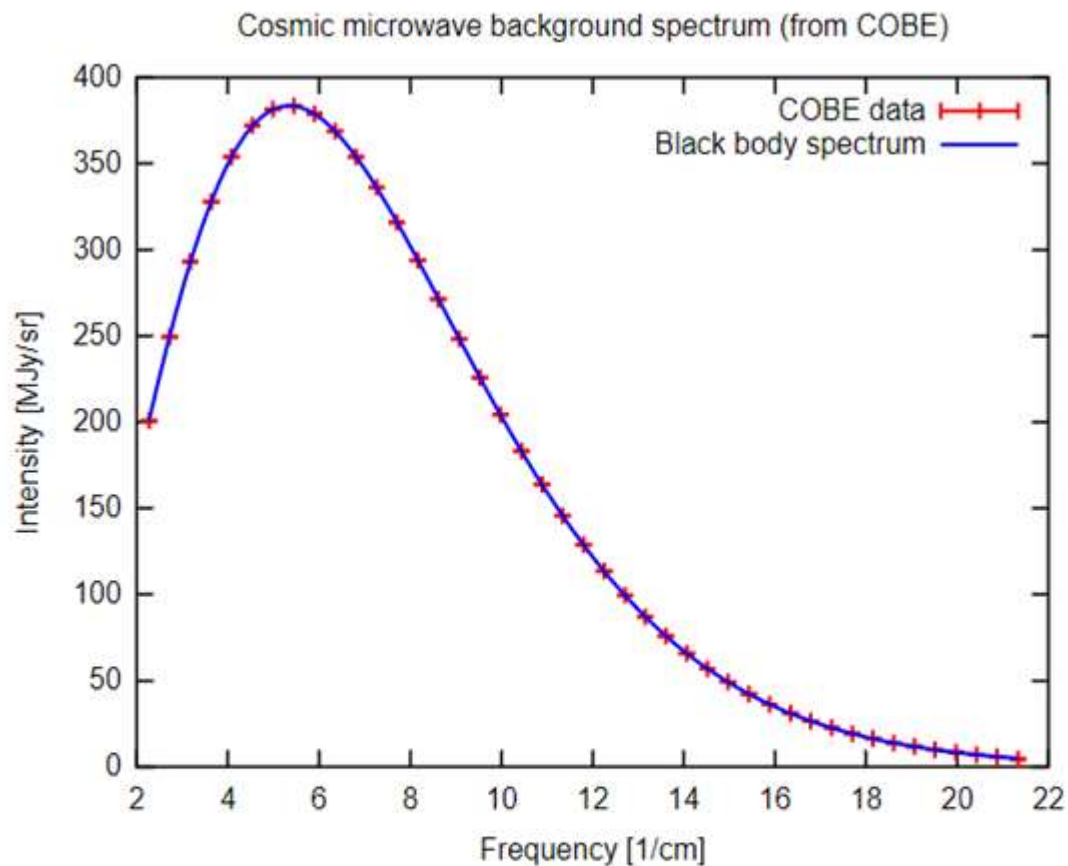


Definition of red shift (depicted by Sadanori Okamura, regular member of the astronomical society of japan)

Fig.13

The main reason they say that the cosmic background radiation is the evidence of Big Ban theory is two points that it is in an isotropic manner and it is corresponding to the 3k spectrum of black body radiation.

Fig.14 explains the spectral value of the cosmic background radiation and 2.725k of black body radiation. It is found that both graphs are corresponding with each other. As this value is observed on the earth, so thinking it together with the observed red shift parameter z the temperature of “clear up of the Universe “(recombination) is presumed at 3,000k.



The spectrum of cosmic background microwave radiation by COBE. The unit of wavelength (the horizontal axis) is wave number per 1cm. It says the peak is the wavelength 1.9mm, 160.2Ghz at 5 on the horizontal axis, (Cosmic Background Microwave Radiation Wikipedia translated by Ichiro Nakayama)

Fig.14

But this cosmic background microwave radiation is also the evidence of” the universe circulation system by the energy body theory” Gravitational field, galaxies and the other are in high energy states of energy body (shrinkage of energy cell bodies). On the other hand, the edge of the universe in low energy states of energy body (expansion of energy cell bodies). Therefore, gravitational field, galaxies, and the other matter travel for the edge of the Universe, and after exceptionally long time arrive there. And there, they are untied from restrictions, spread out energy widely melting down at super high temperature. This process spreads in multi layered. Also, as the dark energy field forms one system in the whole Universe, the direction in which gravitational field, galaxies, and the other matter travel becomes in an isotropic manner. More if you watch it with a bird-eyes view, you will find a great wall being

swallowed into the edge of the Universe. And the released energy becomes cooler while traveling to the center of the Universe. Its temperature cools down to 3,000K, that is called “clear up of the Universe “(recombination) in Big Ban theory, and the electromagnetic wave emitted at that time is the cosmic background microwave radiations. It has been continuing endlessly repeating from infinite past. The photons which emitted at the “clear up of the Universe “(recombination) arrive at the earth after 13.8 billion years and are observed by us now. The cosmic background radiations are observed as 3k, but the wavelength has been extended to 3k by the red shift due to the universe expansion until photons arriving at the earth. Fig.15 the shape of cosmic background radiation closely resembles the great walls. In Big Ban theory, the anisotropies in the cosmic background radiation grows the great wall. But, in the energy body theory, the great wall is the cause of the anisotropies in the cosmic background radiation.

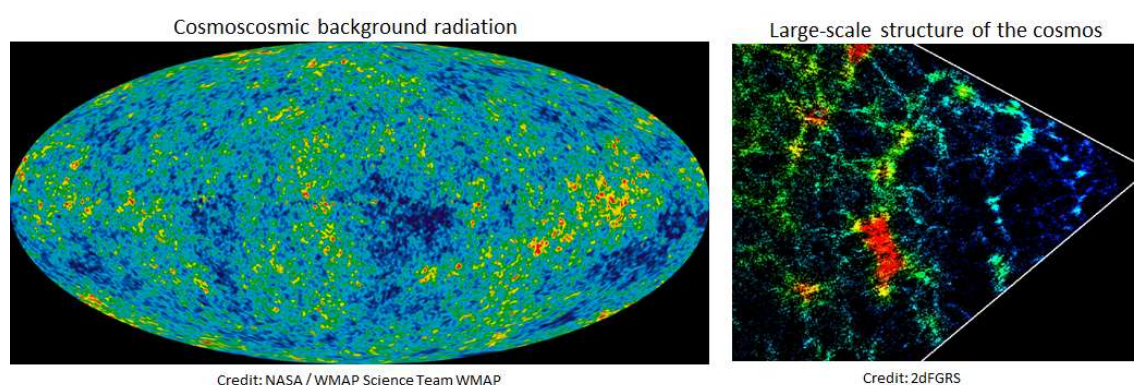


Fig.15

9.4. The location of old galaxies and young galaxies

The discovery like the next two is hard to be explained by the Big Ban theory, but rather than by the Universe circulation system in energy body theory.

① Matured galaxies were found 10 billion light years away – by Subaru telescope

An international team led by Researcher Masato Onodera affiliated with French Office of Atomic Energy (Commissariat a l'Energie Atomique) detected the spectrum of infrared radiation emitted from an elliptical galaxy which is located far away and extremely bright by Subaru Telescope. The light was emitted at quarter of present cosmic age from the galaxy and arrived at the earth after 10 billion years. It was strangely enough. In contradiction to the several results of studies until now, even though the galaxy was found in the Universe 10

billion years ago, it is like the tribe called an elliptical galaxy existing in the present Universe. It exists that elliptical galaxies which increase their volumes 100 times bigger for 10 billion years, on the other hand a mystery why enough matured elliptical galaxies exist at early Universe is deepened. (translated by Ichiro Nakayama)

② Machine Learning Finds a Surprising Early Galaxy—Breaking the Lowest Oxygen Abundance Record.

The research team then performed follow-up observations to determine the elemental abundance ratios of 10 in the 27 candidates selected by the computer. They have found that one galaxy (HSC J1631+4426), located 430 million light-years away in the constellation Hercules, has an oxygen abundance only 1.6% of that of the Sun. This is the lowest values ever reported for a galaxy. The measured oxygen abundance suggests that most of the stars in this galaxy formed very recently. In other words, this galaxy is undergoing an early stage of the galaxy evolution. “What is surprising is that the stellar mass of the HSC J1631+4426 galaxy is very small, 0.8 million solar masses. This stellar mass is only about 1/100,000 of our Milky Way galaxy, and comparable to the mass of a star cluster in our Milky Way,” said Prof. Ouchi of the National Astronomical Observatory of Japan and the University of Tokyo. This small mass also supports the primordial nature of the HSC J1631+4426 galaxy.

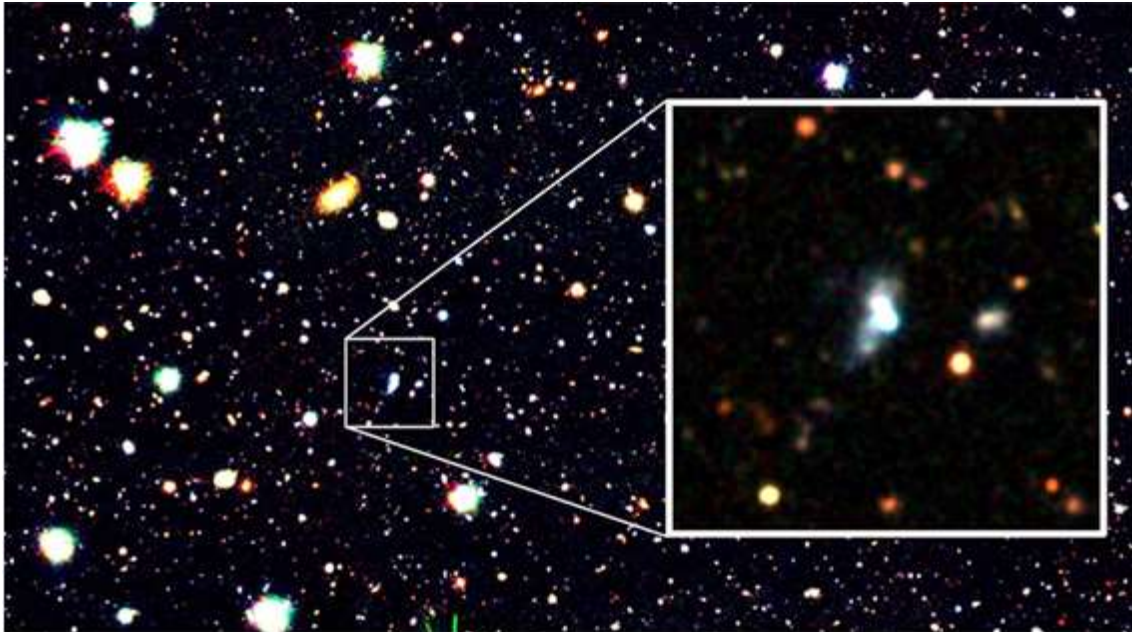


Image of HSC J1631+4426 discovered by the international team with the Subaru Telescope. HSC J1631+4426 broke the record for the lowest oxygen abundance. (Credit: NAOJ/Kojima et al.)

Fig.16

9.5. Equation of gravitational acceleration

It was cleared from the explanations so far that the energy body theory is rational to explain gravity, dark matter, the dark energy, and the reason for galaxies mutually become more distant. Lastly, I introduce that the gravitational model by the energy body theory can derive gravitational acceleration theoretically, not empirically.

Gravitational field is composed of space layers on which energy cell bodies are arranged. Fig.17 shows it. Space layers are piled up by repeating collapses that is transfers of energy from the outside space layers to the inside space layers. The reason occurrence of collapses repeating is that energy in the outside space layer collapses into the inside space layer, then after that, the outside space layer becomes in low energy states. It means the outside space layer takes standpoint of the inside space layer this time.

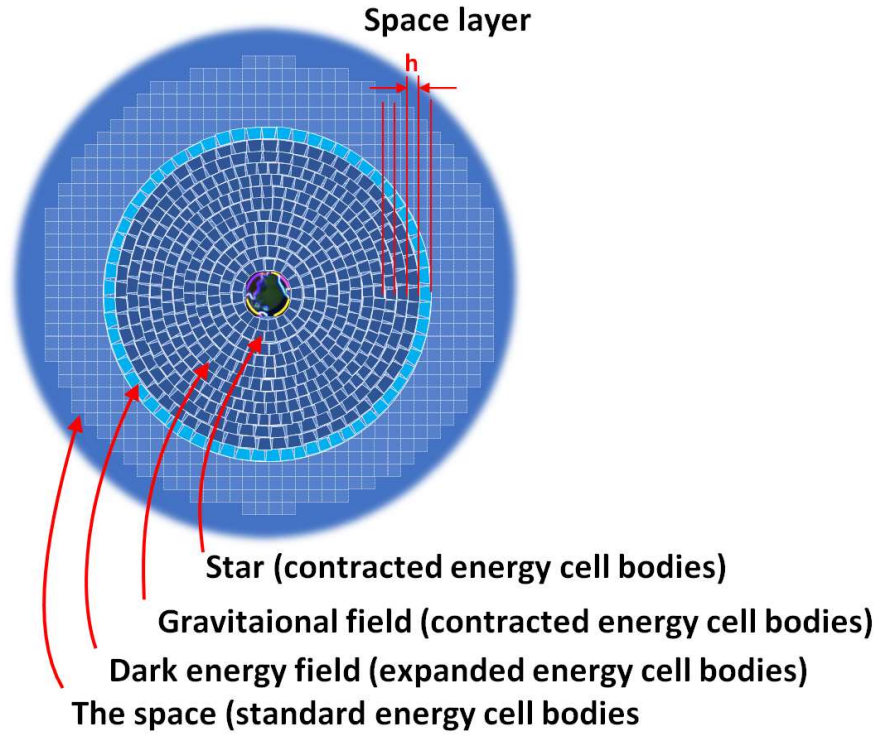


Fig.17

There is almost no difference of shrinkage rate of an energy cell body between the inside space layer and the outside space layer. The difference of energy is caused by the different volume of space layer between the inside and the outside. In fig.18, 19, the energy difference D_n located R from a star center is caused by the difference between the inside space layer m and the outside n . D_n is obtained by multiplying the unit energy e_g of energy cell body in a space layer to the different volume between the volume V_m of the inside space layer and the volume V_n of the outside.

$$D_n = (V_n - V_m) \cdot e_g$$

$$V_n = \frac{4}{3}\pi(R + h)^3 - \frac{4}{3}\pi R^3$$

$$V_m = \frac{4}{3}\pi R^3 - \frac{4}{3}\pi(R - h)^3$$

$$D_n = 8\pi R h^2 \cdot e_g$$

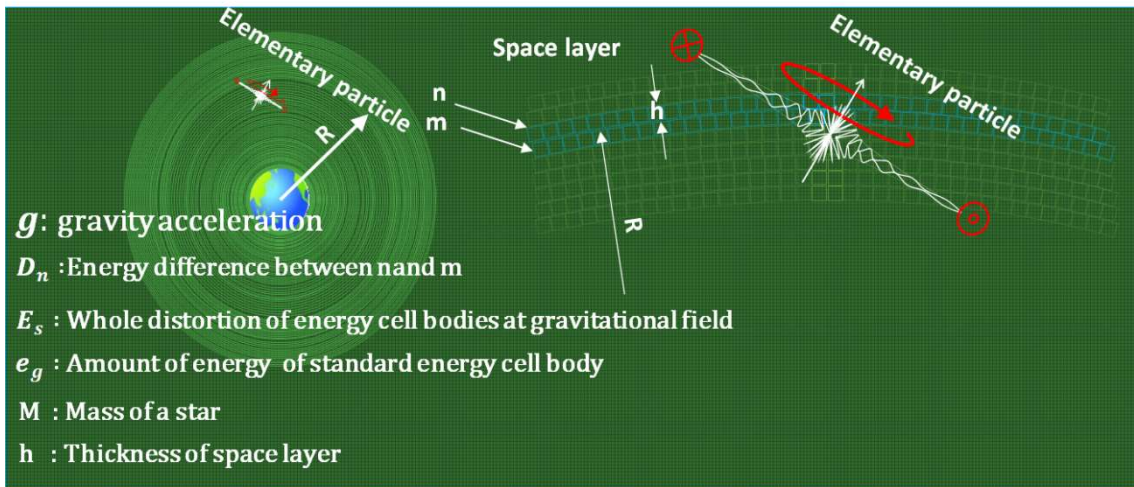


Fig.18

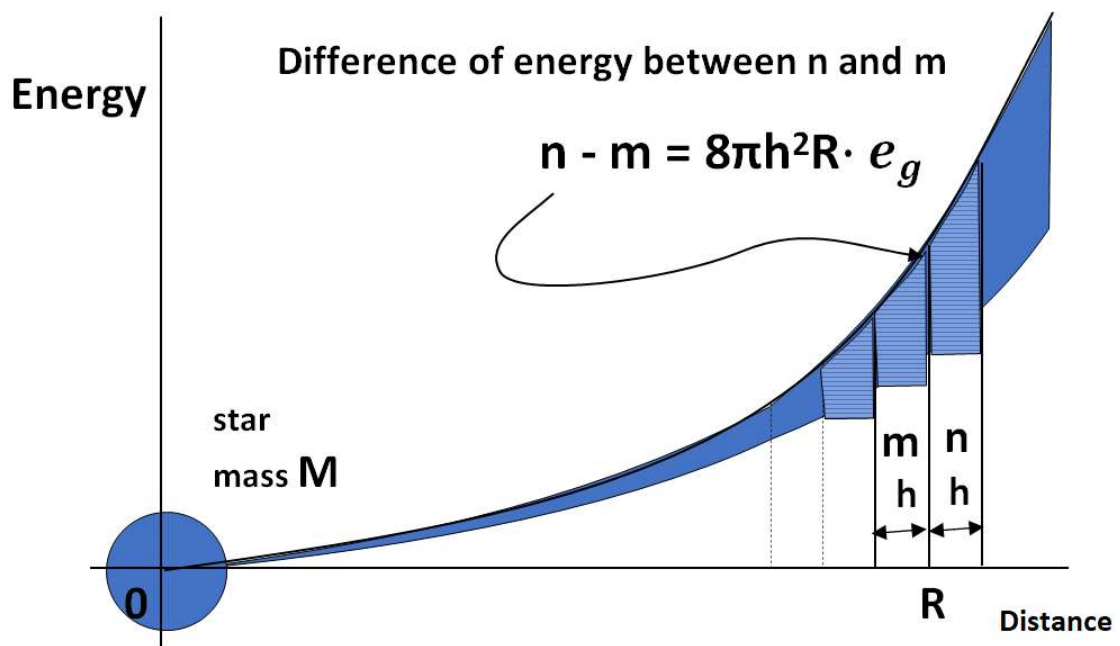


Fig.19

The amount of the whole distortion (energy amount) of energy cell bodies which is made redundant through the process of gravitational field forming E_S changed into the whole mass of a star. Then it is $E_S = M$. Also, it is the same as integrated $D_n \cdot e_g$ by R.

$$\begin{aligned} E_S &= \int D_n \cdot e_g d_R \\ &= \int 8\pi R h^2 \cdot e_g d_R \\ &= 4\pi h^2 R^2 \cdot e_g = M \end{aligned}$$

Therefore,

$$e_g = \frac{M}{4\pi h^2 R^2}$$

Here, $e_g = g$

g is gravitational acceleration.

Also,

$$\frac{1}{4\pi h^2} = G$$

Then,

$$g = \frac{GM}{R^2}$$

is introduced.

More in reality, all energy in space layer does not collapsed, so it needs to multiple density σ .

An object (elementary particle) put in the gravitational field naturally moves to the space layer in less energy amount because of the different energy amount between the outside and the inside. The interaction with gravitational field is a unilateral relationship of the one-way an object receives different energy amount. While the interaction of electromagnetic field is depended on each direction of rotating waves between two elementary particles. Two objects attract each other by gravity, but they are separated force. And as soon as the object begin to move, the undulation of kinetic energy generates at the space in front of the object.

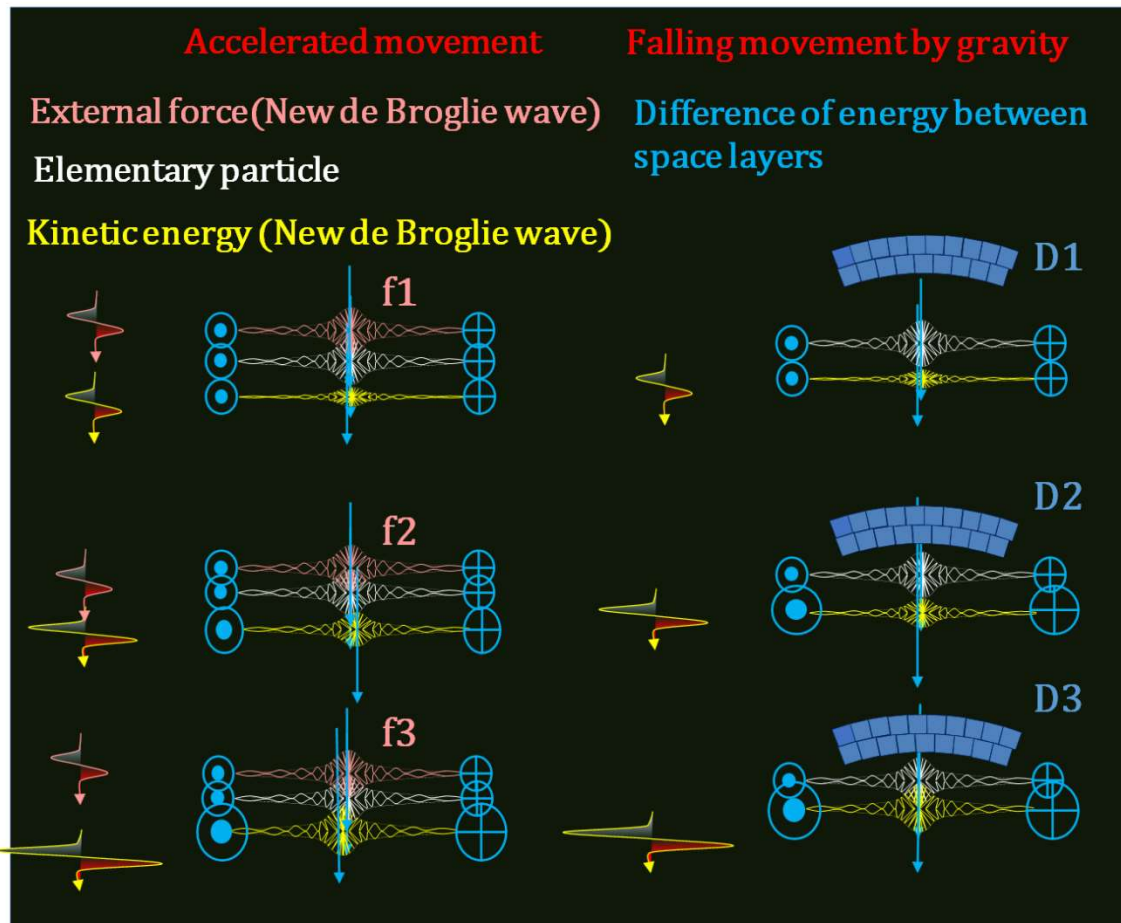


Fig.20

10. Conclusion

It was cleared that the relationship among elementary particles, gravitational field and the dark energy is never cut. More, the dark matter has been one of the biggest mysteries, but also it was cleared that the dark matter is gravitational field too. And the cause that galaxies shifts away from each other in an isotropic manner is either Big Ban or cosmic inflation but is “the Universe circulation system”. It is explained that the composition of the present Universe is estimated as 4.9% ordinary object like atoms, 26.8% dark matter and 68.3% dark energy. But the energy body theory insists that the composition of the Universe should be that 50% is common matter and dark matter, and 50% is dark energy. It is obvious from the explanation of generation and extinction about elementary particles, gravitational field, and dark energy so far. The origin of energy is restoring force from distorted energy cell bodies composing the space. Then, the conservation law of energy must be preserved. The theme of this article, “Cosmological Term of Einstein Equation” predicts this. In other words, it indicates that there

is negative energy against the contraction of the Universe by gravity. This corresponds to the dark energy in the energy body theory.

Supplementation

The model of the Universe structure from energy body theory has firm rationality. But the Universe circulation system will demolish Big Ban theory studied by all over researchers. So, it needs to be inspected some theories sustaining Big Ban theory more politely. It is especially isotropy problem. +

- ① If galaxies shift in a perfect isotropic manner, energy body theory will have a week point.
- ② In the same way, if the electromagnetic waves emitted from the universe background radiation have the same strongness, energy body theory will have a week point.

More

The European Space Agency

Rethinking cosmology: Universe expansion may not be uniform

Astronomers have assumed for decades that the Universe is expanding at the same rate in all directions. A new study based on data from ESA's XMM-Newton, NASA's Chandra and the German-led ROSAT X-ray observatories suggests this key premise of cosmology might be wrong. ~ abbreviation ~ "Together with colleagues from the University of Bonn and Harvard University, we looked at the behavior of over 800 galaxy clusters in the present Universe," says Konstantinos. "If the isotropy hypothesis were correct, the properties of the clusters would be uniform across the sky. But we actually saw significant differences." ~ abbreviation ~

http://www.esa.int/Science_Exploration/Space_Science/Rethinking_cosmology_Universe_expansion_may_not_be_uniform

Reference

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