Kha - a new theory of the universe

Introduction

Most people have heard that the universe was created in the Big Bang. According to this commonly accepted model, the universe did not exist before the Big Bang. The universe initially occupied less space than even a nucleus, but in a fraction of a second, the entire universe was filled with energy. It became a sort of soup, about the size of a grapefruit, with an immense energy density. This creation process cannot be explained by known physical forces. It violates the law of conservation of energy, the most fundamental principle in physics. For this reason, numerous researchers expect that there must be another, better theory about the universe.

Two years ago, I became aware of the unsolved problems in the cosmological Big Bang theory. I wished to solve these problems, so I worked systematically to produce an alternative. My initial hope was to work together with leading physicists at Danish universities. They did not display any interest in my theory, so I continued to working alone. As a qualified physicist, having studied at the Niels Bohr Institute, I know the laws of physics and it is upon these I base my calculations.

In the Kha theory, a sort of limitless "soup" has always existed, which I call the Kha field. The Sanskrit word Kha means ”primordial nebula”, ”space”, ”sky”. A similar word is known in other Indo-European languages. In Greek the word Khaos means ”unlimited space”, “primordial mixture”, “empty space”.

It is a well known fact that the galaxy world is expanding. Cosmology must explain this. In the Big Bang theory, we suppose that the universe contains a mystical, dark energy, called lambda, which has a repulsive force. 70% of the energy in the universe is estimated to be dark energy. Nobody has observed dark energy, and nobody knows what it is made of or where it can be found. In the Kha theory, the expansion of the universe can be explained using known properties of particles and known physical laws.

How is matter created? Atomic nuclei contain protons and neutrons, held together by a so-called gluon field. The name *gluon* is derived from the word *glue.* Each proton or neutron consists of three particular quarks, also held together by the gluon field. Quarks must be created before neutrons, so one can consider that the aforementioned soup also contained quarks. This applies to both the finite soup of the Big Bang and the infinite soup in the Kha theory. The difference is that in the Big Bang, the energy density was much greater; so great, in fact, that the quarks combined into particles and antiparticles extremely quickly. A problem with the Big Bang theory is that it does not explain what happened to the antiparticles. The Kha theory describes the separation of matter and antimatter and explains where antimatter is located.

Summary

The eternal and limitless universe is composed of fields, which I have named Kha. All the parts of Kha move with the velocity of light through each other. Quarks are eddies in the Kha field. Neutrinos are parts of the Kha field with a helical shape. The Kha field remains for ever at all places as a gravitation field around the particles. Forces do not work at a distance. Particles are only influenced by the Kha field they get in touch with, and this contact explains nuclear forces, gravitational forces, electric forces, inter-atomic forces and radioactive decays.

The primordial Kha soup had high energy density. The complete quarks and complete neutrinos had the same energy density as the original Kha field. Three complete quark pairs could form a neutron and an antineutron. These particles wandered around and two areas arose in the Kha soup with excess of neutrons respectively antineutrons. Neutrons glued to each other and accumulated in cores of neutronium, that later became galaxy cores. The energy density was high near the cores. Fireballs arose and they later became galaxies. The majority of the energy was used for forming neutrons and anti-neutrons, which in the meantime annihilated and produced a large number of decay neutrinos. The formation of fireballs stopped where the cores were sparse. The pressure of the decay neutrinos on the excess neutrons explains the short acceleration of the universe and the following expansion.

Electrons are bound to atoms by merging with the the positive field around the nucleus. Photons have a double helical shape. When they pass by they borrow some of the Kha field, and consequently always have the velocity of light compared to the local Kha field. Consequently the special theory of relativity is rejected. Kinetic energy of a particle is due to a concentration of Kha field in front of and behind the particle. The formation of spiral galaxies can be explained by magnetic forces. The process of the formation of galaxies implies the existence of antimatter between the galaxies. The main part of dark matter is antimatter in form of droplets of Hydrogen and Helium.

Galaxies are found in a limited part of the universe and beyond is the primordial infinite Kha field. The field beyond is moving away at high speed caused by irradiation by decay neutrinos from the fireballs. The field itself emits radiation and because of the high velocity of the field away from us we observe the microwave background radiation. However it is possible to see small areas with greater radiation, probably from fireballs in the Kha field beyond.

Quarks and neutrinos

Since there are no particles in the Kha soup, energy must exist in the form of fields. The Kha soup is composed of fields that penetrate each other and move in all directions at the speed of light, *c*. Positive and negative particles are created by these fields at some point, so there must be a positive field and a negative field. There is no neutral field, but the field itself is normally neutral, as the positive and negative fields are present at the same density. Small quantities of neutral field move at the speed of light through the remainder of the Kha field. I call these quantities of varying sizes *packets.* A packet contains a quantity of neutral field moving in a translational manner in the same direction as the packet, at the speed of light, *c*. This translational part has kinetic energy and momentum. However, the packet is often incomplete, since it also contains neutral field moving in all possible directions; it has thermal energy.

The packet encounters no opposition. The field in front of the packet becomes consumed, and a portion of this field receives the packet's translational velocity. The packet leaves behind it a corresponding neutral field with random velocities. The energy density inside the packet is the same as that outside it. Complete packets also exist, containing only translational field.

Figure 1. The formation of a quark pair

Let us see what can occur when two identical packets meet. To the left, we see two packets approaching each other. When the two packets collide, the combined translational energy will be doubled. The streams of positive and negative fields attract each other. Ampere's Law applies here. Two electrical currents travelling in the same direction attract each other, and two travelling in opposite directions repel each other. Thus, the two packets cannot continue their movement undisturbed. A reorganisation occurs in which the two oppositely charged fields remain in contact, moving in opposite directions. If the two packets have the same energy and opposite velocities, their total momentum is zero. But the velocity cannot be zero, since all fields move at the speed of light.

A positive portion of the hot field suddenly begins to rotate in one direction, pulling the positive portion of the translational field along with it. A corresponding negative field rotates in the opposite direction. A stable state exists, in which the fields rotate and the total kinetic energy is equal to the packets' translational energy. To the right, we see two rotating fields, called quarks. They are drawn next to each other, but they form in the same location. A quark and an antiquark have opposite charges and opposite spins. Their currents travel in opposite directions, but their electrical currents are unidirectional. Thus, the quark pair is held together. If these packets are a symmetrical system, then the quarks must also be symmetrical. Thus, two quark pairs must be formed with opposite electrical current directions. Per Ampere's Law, the two quark pairs will repel each other.

If the two packets are a completely symmetrical system, the quark pairs will be at rest. Ordinarily, the two packets will be of different sizes. They will not collide centrally, and they will not move in opposite directions. The quarks' spins and energy will depend on these conditions. In an asymmetric collision, only a portion of the packets' energy will be put toward the formation of quark pairs. The remaining energy will go toward the movement of the neutral fields, each with its own quark pair.

As early as 1969, Richard Feynman wrote that, in a collision of nuclei, mobile *partons*—parts of nuclei—are produced in the nuclei. This was before we were aware of quarks, but partons are likely complete quark pairs. Complete quark pairs can also exist briefly outside of nuclei as neutral pions, consisting of a quark and its antiquark.

Large numbers of quark pairs are formed, but they do not exist for very long. Those quark pairs present in the original Kha field are incomplete. The rotating field is only part of the quark pair, through which hot, neutral, Kha field also passes. In some part of the quark pair, the positive and negative fields of the neutral Kha field may move in opposite directions. The negative field can pull the positive quark along with it, moving away as a neutral packet. Simultaneously, the positive field and negative quark emit a packet in the opposite direction. The quark pair thus decays into two neutrinos.

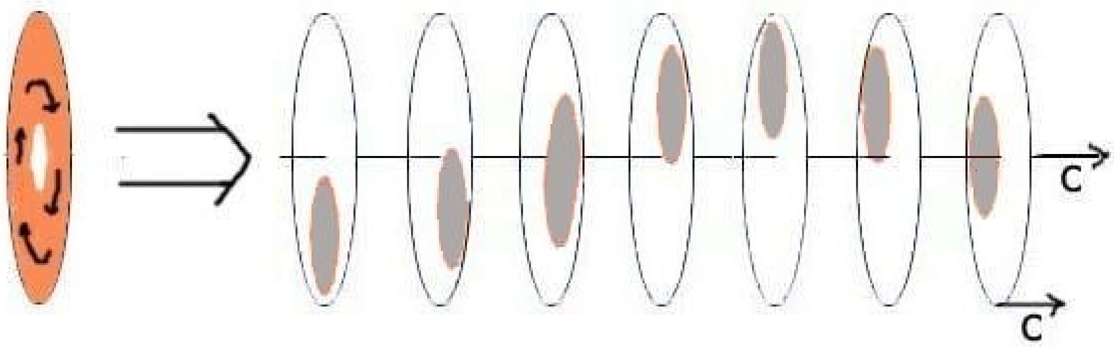


Figure 2. An anti-neutrino

The emission of the packet is a process that begins in the quark. It takes some time for the process to expand to the entire quark. Therefore, the packet emitted by the quark will have a helical shape as shown in figure 2. This helix is an anti-neutrino. The helix consists of a neutral field, shown in grey, moving along the axis at the speed of light; here, toward the right. The position of the field is here shown only in a series of "slices", drawn perpendicularly to the axis. The slices follow the helix. If we observe a location in space as the helix passes, we will see a brief clockwise rotation of the field, provided we face the direction of movement.

We can say that this neutrino has a positive spin, +½. Traditionally, it is called an anti-neutrino. A neutrino has a negative spin, –½. Neutrinos cannot remain at rest, and therefore have no resting mass. They move at the speed of light. We do not know much about them, as they are very difficult to observe. It is possible that neutrinos can be joined or split apart; this is a point of departure from the indivisible neutrinos of quantum mechanics.

At the far left, we see the clockwise-spun quark before being left by the helix. The diameter of the quark is equal to the "thickness" of the helix. The circumference of the quark is π times the diameter and equal to the length of the helix. This is the neutrino's wavelength.

Quark pairs

Two neutrinos can create two quark pairs when a helix meets another helix spinning in the opposite direction. The neutrinos must have the same energy as the quark pairs. Formation and dissolution of quark pairs occurs incessantly in the Kha field, consisting primarily of neutrinos and quark pairs. Neutrinos are spread elastically and inelastically by quark pairs. There will thus be neutrinos and quarks with all different possible energies.

The Kha field can be described similarly to black-body radiation of photons. Here, Planck's law applies to the spectral density across all frequencies. A quark with frequency f has energy $E = hf$, where h is Planck's constant. The quarks' electrical fields move at the speed of light, c. Using the quarks' radius r, we can calculate the frequency of the field's revolution, $f = c/2\pi r$

$$E \cdot r = h \cdot f \cdot r = h \cdot \frac{c}{2\pi r} \cdot r = \frac{ch}{2\pi} = 3.2 \times 10^{-26} \qquad (1)$$

A neutron consists of two down quarks, each with a charge of -⅓ e, and an up quark with a charge of +⅔ e. I am of the belief that the up quark is formed by two antidown quarks. The neutron with energy 940 MeV is thus formed by four quarks, each with energy equal to 940/4 = 235 MeV = 3.8×10^{-11}. From formula (1) we obtain the radius

$$r = \frac{3.2 \times 10^{-26}}{3.8 \times 10^{-11}} = 9.4 \times 10^{-16}$$

This quark radius fits well with that of the neutron, which is often set to 10^{-15}. Using equation (1) we can determine Planck's constant h, having measured the quark's energy and radius. The quantum of action h, which plays a significant role in quantum mechanics, is actually an expression of the quarks' size.

The incomplete quarks and neutrinos in the original Kha field had less energy than the complete quarks found in normal particles, but we consider them quarks all the same. From formula (1), we can see that the incomplete quarks' radius was greater than that of normal quarks.

Two complete neutrinos can form two complete quark pairs (figure 1). An incomplete quark pair can form two complete neutrinos, but a complete quark pair cannot itself form neutrinos (figure 2). Thus, the energy density of neutrinos and quarks may be no greater than the energy density of the original Kha field. Upon reacting with neutrinos, the incomplete quark pairs gain more energy. The field becomes overwhelmingly composed of complete quark pairs. Planck's law must be adapted here, as the quark pairs can have all possible energies, but no more than the energy of the complete quark pairs.

Why particles and quarks have particular masses and charges has not been explained. At equilibrium, the original Kha field has the same energy density throughout. This is also the energy density of complete neutrinos and quarks. From this, we can find the energy density of the original Kha field.

$$e = \frac{E}{\frac{4}{3}\pi r^3} = \frac{3.8\times 10^{-11}}{\frac{4}{3}\pi\left(9.4\times 10^{-16}\right)^3} = 1.1\times 10^{34}$$

This is approximately 1/4 of the energy density in neutrons. Equation (1) shows that normal quarks' energy, radius, spin, and charge are determined by the energy density in the original Kha field.

We can consider the radius r_0 of that part of the original Kha field, which has since become our universe of galaxies. The mass of the visible portion of the universe, as far out as the most distant galaxies, is often considered to be 10^{53}. If we add antimatter to this figure, the mass is doubled. A significant amount of energy has disappeared from this universe in the form of neutrinos and photons. I presume that ⅔ of the energy has disappeared. From this, we find that the original mass of the "ball" was 6×10^{53}.

Using the energy density e in the original Kha field, we obtain

$$e = 1.1\times 10^{34} = \frac{6\times 10^{53}\cdot 9\times 10^{16}}{\frac{4}{3}\pi r_0^3}$$

$$r_0 = 1.0\times 10^{12}$$

Her we have to take in consideration that some of the original Kha field is now preserved in the gravitation field. I have estimated the energy of a neutron plus the energy of the gravitational field in a sphere with the double radius. This energy is about the same as the energy of the original Kha field in the same sphere. Consequently we obtain

$$r_0 = 2,0 \times 10^{12}$$

For comparison, the radius of Saturn's orbit is 1.4×10^{12}.

Neutrons

Unlike incomplete pairs, complete quark pairs cannot immediately be transformed into neutrinos. Here, we will focus on the complete quark pairs (partons).They will wander about in the Kha field, so to speak. There will often be several quark pairs in the same place, at the same time. When two quark pairs with opposite electrical current directions exist in the same place, they can be annihilated. Thus, the process shown in figure 1 could also proceed backwards, forming two neutrinos. However, two photons would probably be formed instead. Neutral pions decay into two photons. The resulting photons have the same energy as the quark pairs. Thus, two photons that meet may again form two quark pairs.

Particles consist of quarks; like quarks, they are eddies of fields from the Kha field. The deep truth here is that the universe consists of only Kha field. All energy comes from the Kha field, whether it is a concentration of the field in particles that have spin, or other concentrations of field that can be found between particles. A quark pair consisting of a down quark and an antidown quark is the smallest particle in the universe, but this quark pair is the cornerstone of the entire universe of particles.

Three quarks of different types can melt together without forming a quark pair. The three quarks form a particle that can exist for a longer period of time. Electrically charged particles, like protons, quickly disappear because they are attracted to their antiparticles with the opposite charge. These electrically charged particles are thus annihilated and become neutrinos. But neutrons and antineutrons are neutral, and can thus be found in great quantities in the Kha field.

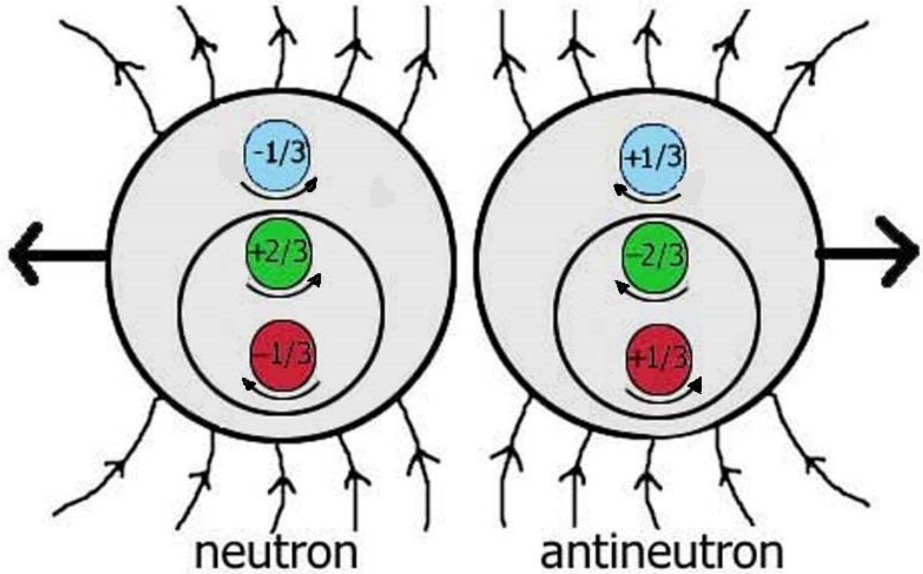


Figure 3

The figure shows the formation of a neutron/antineutron pair. To form a neutron, three particular quarks are needed: two negative down quarks and a positive up quark. The quarks' spin and charge are marked. Antiquarks have the opposite spin and charge. The total charge of the three quarks in the neutron is zero. We do not know how the three quarks are placed in the neutron. We can imagine the three quarks as concentric rings. I suppose that the green and red quark penetrate each other, since they have unidirectional electrical currents and, according to Ampere's Law, attract each other. They form a positive inner ring. The blue quark, with the opposite electrical current direction, is repelled and forms an outer ring.

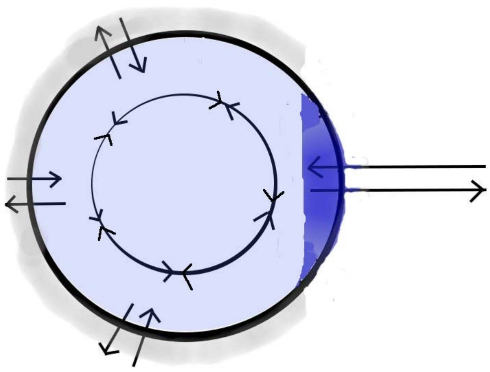
Experiments show that neutrons and antineutrons have a magnetic moment. The magnetic moments are marked by magnetic field lines on figure 3. The neutron and antineutron have magnetic moments in the same direction, so they repel each other. Thus, the neutron pair will not immediately collide and be annihilated. The Kha field contained many neutrons, antineutrons, and neutrinos. A neutron is struck by neutrinos and moves about in the Kha field until it encounters an antineutron and is annihilated.

In this annihilation, three pions (partons) may be formed, each consisting of two quarks. According to experiments the pions have kinetic energy approx. 200 MeV. Their rest energy is only 140 MeV, less than 235 MeV, which is nescessary to produce new neutrons. The pions ultimately end up as a greater quantity of neutrinos and quark pairs.

Forces

The forces of physics must be understood in a new way. The common understanding is that forces operate over long distances. However, I subscribe to the Scottish physicist, James Maxwell, who was of the belief that forces only operate locally. My theory is that all forces on particles are a result of effects from the Kha field the particle is in contact with. This implies an entirely new theory of the forces in the universe.

Kha is composed of fields like electromagnetic fields and the attracting force per area is equal to the energy density of the radiation. The gluon field in atomic nuclei has an attracting force that keeps the nucleons in a nucleus together. In general, we can describe the Kha field as an energy density or field strength indicating the attracting force per unit area. The attracting force can be demonstrated by a Crookes radiometer. A mill with four vanes is placed in a glass bulb from which the air has been removed. One side of the vanes is shiny and reflects light. When the mill is illuminated, it spins as the shiny sides of the vanes are attracted to the light.



Figur 4.

The attracting force of the light is explained in figure 5. It shows a particle—in this case, an atom. Fields and neutrinos run in and out along the surface of the atom, marked with arrows. An outwardly directed force operates on the atom in all directions. The light from the right subjects the atom to a greater current of fields I.e. photons and thus a greater energy density on the right. To balance this difference, the field runs outward to the same extent as it does inward. The field can leave the atom in the direction to the right, where the density outside is low. Thus the light is reflected. The high energy density on the right side results in an attracting force y the right on the surface of the particle. The particle is attracted by a force on the side where the energy density of the Kha field is greatest. This principle can likely explain all forces on particles, including strong gluon forces, electrical forces, and gravitational forces.

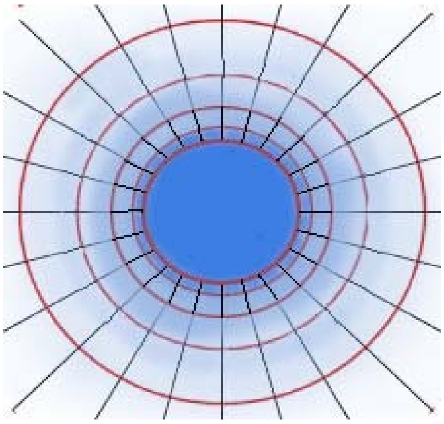


Figure 5.

The figure shows a particle alone in the Kha field. All particles are eddies with a spin. The energy density is high within the particle. Outside the particle, the energy density decreases continually from the high value at the particle's surface. The field very rapidly reaches an equilibrium, meaning that the energy density is constant everywhere in time. Due to symmetry, the energy density is equal at all points with the same radius *r*. The red energy lines are drawn through points with the same energy density. The black force lines radiate out in the direction of the decreasing energy density. More closely spaced energy lines and force lines show greater energy density.

We can calculate how the energy density *e* is dependent upon the radius *r* by considering a spherical shell with thickness *dr*. Due to the equilibrium, the force on the interior is equal to the force on the exterior. The growth in energy density, *de*, must be negative.

$$e*4\pi r^2 = (e+de)*4\pi(r+dr)^2$$

From this, we can calculate

$$e = e_0 * r_0^2 / r^2$$

Where e_0 is the energy density on the surface of the particle, and r_0 is the particle's radius. Now we know how the field strength decreases as the distance from the particle's centre increases, but it never becomes equal to zero. This means that Kha is present throughout the universe, but at different densities.

Next, we examine the attracting gravitational force between two masses. Figure 6 shows the traditional gravitational field. The force lines and energy lines are closer on the near side than on the far side, resulting in an attracting force on the masses.

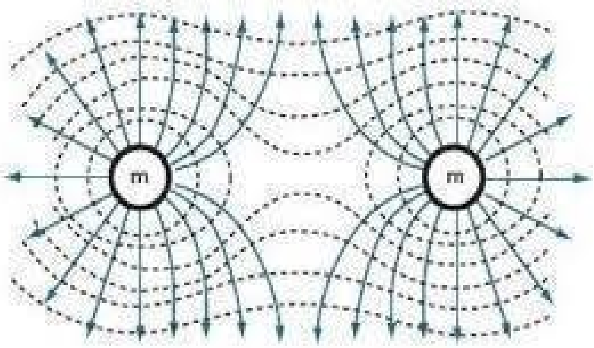


Figure 6. A gravitational field

We can calculate the approximate force between two particles. We will designate the fields from the two particles e_1 and e_2, respectively. We will consider a flat disc with an area 1 and thickness of *dr* perpendicular to an axis. The total force on the disc from the field e_1 is de_1 and its contribution to the overall field is $e_1 * de_1$. From this, we obtain

$$e * (de_1 + de_2) = e_1 * de_1 + e_2 * de_2$$

$$e * (e_1' + e_2') = e_1 * e_1' + e_2 * e_2' \quad (2)$$

Next, we will examine two neutrons that are very close to each other. The neutron's energy density at its surface is determined by the energy density of the quarks, 1.1×10^{34}. But deep within the neutron, there is a concentration of quarks that increases the energy density at the surface to perhaps twice that value.

$$e_n = 2.2 * 10^{34} \qquad e = e_n * r_0^2 / r^2 \qquad e' = -2 * e_n * r_0^2 / r^3$$

At the point of contact between neutrons 1 and 2, $r_1 = r_2$, $e_1 = e_2$, $e_1' = e_2'$. Equation (2) gives us $e = e_n$. At the back of quark 1, $r_1 = r_2/3$, $e_1 = e_2 * 9$, $e_1' = e_2' * 27$. Equation (2) gives us $e = e_n * 27/28$. The energy density at the back is decreased by $e_n/28$. We can suppose that this applies for an area $0.2 * r_0^2$ on the surface of the neutron. Thus, we obtain

$$\text{the force on the neutron} = 2.2 \times 10^{34}/28 * 0.2 \times (10^{-15})^2 = \text{approx. } 160 \text{ N}$$

This is the gluon force. The binding energy is the work that would be required to disassemble the pair of neutrons. When we multiply the force with the neutron radius 10^{-15} we get

the binding energy of two neutrons = $160*10^{-15}$ = 1 MeV

This is close to the experimental value.

We can not use Newton's gravitational law to explain the force between two neutrons since it gives only about $2 *10^{-34}$ N. But gravitational forces can be explained by the action of the Kha field. All particles and masses are surrounded by a Kha field. The field can also be called the gravitational field, and the field strength is equal to the energy density.

The moon

We can consider figure 5 to show the moon. The nuclei in the moon have an energy density determined by the nuclear mass m_k and the nuclear radius r_k. The energy density e_a of the Kha field of the atom with radius r_a can be calculated using the usual radius relationship.

$$e_a = m_k*c^2/(4/3\pi*r_a^{\ 3})$$

The number of atoms is M/m_k, where M is the mass of the moon. The energy density e_1 at radius r_1 can be calculated by considering that all nuclei are pulled to the centre of the moon.

$$e_1 = e_a* \ M/ m_k * (r_k/r_1)^2 = M*c^2/(4/3\pi*r_a^{\ 3})* (r_k/r_1)^2 = 1.6*10^{39}/ r_1^2$$

Here, we insert $c = 3 \times 10^8$, $M = 7.3 \times 10^{22}$, $r_k = 10^{-15}$ and $r_a = 10^{-10}$.

The mass of Earth is about 81 times the mass of the moon. Earth's field strength e_2 at radius r_2 is obtained using a corresponding calculation.

$$e_2 = 81*1.6*10^{39}/r_2^{\ 2}$$

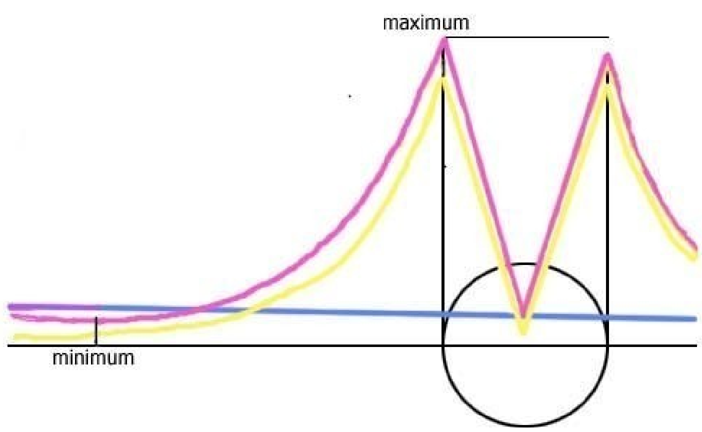


Figure 7. The moon

In figure 7, the moon's gravitational field e_1 is shown in yellow, and Earth's gravitational field e_2 is shown in blue. The resulting field e is in red. There exists a neutral point between the Earth and the moon where the force on a spacecraft is zero. The force on the spacecraft is determined by the local gravitational field; more precisely, by the decrease in field strength. At this neutral point, the two fields have the same decrease in opposite directions, and the combined field strength reaches a minimum.

$$e_1' = e_2'$$

$$2 * 1.6*10^{39}/ r_1^3 = 2* 81*1.6*10^{39}/r_2^3$$

$$r_2 = r_1*4.3$$

Traditionally, we have let $e_1 = e_2$ from which we obtain a factor of 9 instead of 4.3. But this is wrong, since forces do not operate over a distance. The distance from the moon to the neutral point is actually double what it was first assumed to be. This distance is critical in sending a spacecraft to the moon. The total field strength at the neutral point can be calculated from equation (2).

$$e = (e_1+e_2)/2$$

Now, we will examine the field strength on the surface of the moon. Here, e_1' is much less than e_2'. Thus, we obtain an increase in the field strength, as shown in figure7.

$$e - e_1 = e_2 * e_2' /e_1' = 81*1.6*10^{39}/r_2^2 * 2* 81*1.6*10^{39}/r_2^3 /(2* 1.6*10^{39}/ r_1^3)$$

Since $r_2 = 3.84*10^8$ and $r_1 = 1.74*10^6$ we obtain $e - e_1 = 6.4*10^{18}$.

Here, we must also consider that e_2 and e_2' are different for the front and back sides of the moon, so $r_2 = 3,84*10^8 + 2*1,74*10^6 = 3,84*10^8 *(1+0,0091)$. This means that the difference between the increases in the two field strengths is

$$\text{difference in } e - e_1 = 6.4*10^{18} * 0,0091^5 = 4.0*10^8.$$

Let us suppose that this difference is effective for an area $0.2*r_1^2$ on the surface of the moon. In doing so, we obtain

$$\text{force on the moon} = 4,0*10^8*0,2*(1,74*10^6)^2 = 2,4*10^{20}.$$

For comparison, the force according to Newton's gravitational law is 2.0×10^{20}. This calculation is highly simplified, and a computerised calculation of the gravitational field for each point in space under equilibrium should be conducted. Even so, I am of the opinion that the origin of the gravitational force is now explained qualitatively, using the Kha theory. With Kha, we have found the reason for gravity. Newton and Einstein described gravity, but they did not explain its origins.

Electric forces

Let us examine electrical forces. Within a positive particle, there is a high energy density or field strength of the positive field. Outside the particle, there is also a positive field, whose field strength decreases outwardly in the usual manner (figure 4).

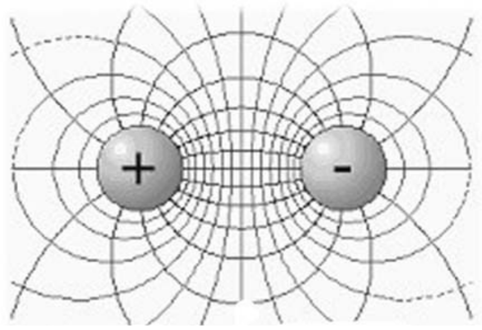


Figure 8. An electrical field

Figure 8 shows a traditional image of two oppositely charged spheres with force and energy lines. Here, we can consider it an image of two oppositely charged particles, each surrounded by its own field. All the force lines run from one sphere to the other. The force lines and energy lines are most closely spaced in the middle area between the two particles; the field strength or energy density is high here. We see that the field strength is greatest on the facing surfaces of the particles. Thus, the particles attract each other.

We can consider the figure as a positive and a negative quark in the Kha field. An outer field is present outside each of the quarks. When the quarks are near each other, we can expect the outer field to be concentrated between them. On the quark's surface, the field strength of the outer field is equal to the energy density within the quark, which we can calculate using the quark's energy and volume. The force is equal to the field strength multiplied by the area of the side. It is quite large; about 500 N. This is the gluon force that causes the quarks to melt together. Using Coulomb's Law to calculate the electrical attraction results in only about 0.1 N: this value is far too small. At small distances, where quarks or nucleons are close together, the forces are not electrical, but the principle of this explanation can be used for large distances; thus, it can likely explain all electrical forces.

We can try to calculate the work *E´* that must be performed to separate a proton and an antiproton. Using Coloumb's Law, we obtain

$$E' = \frac{e^2}{4\pi\varepsilon r} \qquad E'r = \frac{e^2}{4\pi\varepsilon}$$

where *e* is the proton's charge and *r* is the proton's radius. The proton and antiproton are formed by quarks, and must therefore adhere to equation (1) for quark pairs.

$$Er = \frac{ch}{2\pi}$$

By substituting the values of the universal constants *e*, ε, *c*, and *h*, we obtain

$$E'r = \frac{e^2}{4\pi\varepsilon} = \frac{1}{137} \cdot \frac{ch}{2\pi} = \frac{1}{137} Er$$

Thus, calculating *E′* gives us far too small a value, with a factor of 137. This constant of 137, called the fine structure constant, has mystified many physicists. It shows that we cannot work with electrical forces at quark distances, only gluon forces. The fine structure constant of 137 gives the strength of gluon forces in relation to electrical forces.

Continents

Let us now return to our Kha field, with its wandering neutrons and antineutrons. We will look at a mechanism that can separate matter and antimatter. An area A may appear in the Kha field, in which there is an excess of neutrons. Next to it is an area B, with an excess of antineutrons. Pairs of neutrons and antineutrons form throughout the field. Of those neutrons formed between A and B, half will move toward A and half will move toward B. Those that move toward A will have a longer mean path than those moving toward B, as they will not encounter antineutrons as frequently. The result is a movement of neutrons from B to A. This amplifies the excess of neutrons in A. Correspondingly, the movement of antineutrons from A to B will amplify the excess of antineutrons in B. The area A in the Kha field, with an excess of neutrons, will become larger and larger, while the adjacent large area B has an excess of antineutrons. We can call these areas continent A and continent B. These continents together may form a disc-like shape.

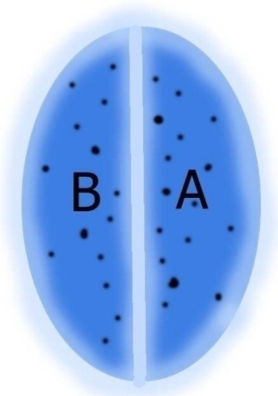


Figure 9 Two continents

A neutron may also collide with another neutron, and the two neutrons will be joined together, as they are attracted to one another by the gluon force. This combination is called neutronium. They will form neutronium nuclei, which we can call "cores", in the Kha field. These cores are drawn in black. The cores collide with each other, forming larger and larger cores. This could be compared with the separation of milk when churning butter. We can suppose that nearly all of the excess neutrons in continent A are gathered into these cores. The same goes for the antineutrons in B.

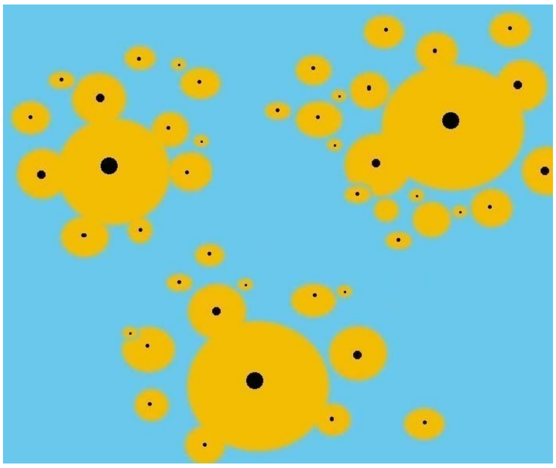


Figure 10 Protogalaxies

The cores have become neutron stars with great masses. These are the black holes we find at the centre of galaxies today. To day the distance from the Milky Way to the Andromeda galaxy is $2{,}4 \times 10^{22}$. We can calculate this distance before the expansion of the Universe to be $4{,}2 \times 10^{8}$, which is approximately the contemporary distance from the Earth to the Moon. Figure 10 shows three large, black cores. Before the expansion of the universe, the distance between the cores was small. Thus, the force of gravity had a greater effect. This attraction caused the light cores to cluster around the heavy cores. The clusters later developed into galactic clusters.

In the Kha field, outside of the cores, there was a large number of neutrons and antineutrons. Near a core, the density of antineutrons decreased, as those antineutrons moving toward the core were annihilated by the core's neutrons. This scarcity of antineutrons, or excess of neutrons, near the core spread to adjacent areas farther from the core. Gradually, a large area appeared near the core with an excess of neutrons, shown here in yellow. The yellow areas later developed into galaxies. Farther from the core, a blue area was created with an excess of antineutrons. This later developed into intergalactic antimatter.

Plasma

Let the energy density be e_n at the surface of a neutron with mass m_n and radius r. Then we will calculate the energy density e_M at the surface of a neutronium core with mass M and radius R.

$$e_M = e_n * \frac{M}{m_n} * \left(\frac{10^{-15}}{R}\right)^2 = e_n * \left(\frac{R}{10^{-15}}\right)$$

The energy density of the Kha field is increased near the core, and consequently is decreased far away from the core. I estimate that the energy density is $e_n/10$ at the distance $2{,}1*10^8$ (halfway to the Andromeda proto-galaxy).

$$e_n/10 = e_n * \left(\frac{R}{10^{-15}}\right) * \left(\frac{R}{2{,}1*10^8}\right)^2$$

From this equation we find that the radius of the nucleus of the Milky Way was R = 1,4 m before the expansion of the universe. The radius to day is determined to $R = 1{,}4*10^5$ m. The reason for the growth of the nucleus is that many of the neutrons from the Kha field are absorbed by the nucleus. The neutrons come from the yellow area with excess of neutrons on figure 10. The absorption continues to day and is an essential characteristic of the black holes.

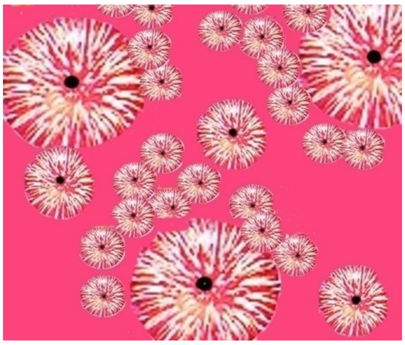


Figure 11 Fireballs

The energy density was high In areas near the neutronium cores. Here was a high concentration of real neutrinos and complete quark pairs and consequently of free neutrons and anti-neutrons. A state of free particles is called a plasma. A minority (I guess 1/3) of the free neutrons moved to an area with excess of neutrons and similar for the anti-neutrons. But the majority (2/3) of the neutrons and anti-neutrons annihilated. Upon annihilation, the quarks from these particles formed new particles, primarily pions.

Upon annihilation of the free neutrons and anti-neutrons, pions arised with kinetic energy approximately 200 MeV. The remaining excess of neutrons was struck by pions, thus also acquiring high energy. At this point, the plasma contained high-energy particles. The plasma around the core became a fireball. The hot plasma spread out into the space between the cores. The spread of the plasma caused the temperature and density of the entire universe to be more uniform. The spread plasma could also increase the Kha energy density of nearby cores, producing new fireballs.

Outside an atomic nucleus the Kha density is low. Free pions here have short lifespans, decaying into photons and neutrinos. These neutrinos and photons, which I will call “decay neutrinos” formed in the fireballs in large number. The decay neutrinos had an energy approx. 30 MeV which is not sufficient to create new complete quark pairs, but the decay neutrinos were spread by the excess neutrons and anti-neutrons. At this point the plasma contained mainly decay neutrinos and excess neutrons or excess anti-neutrons.

The Kha field near the cores was almost unaffected by the spread of plasma. The fireballs continuously contained large amounts of the original Kha field. They powerfully produced new plasma. The density and size of cores, however, was lower near the edges of the continent. We can, therefore, suppose that the density of the cores at a certain radius was so low that fireballs and plasma did not form. Thus, at larger radii, only the Kha field was present and no plasma.

Expansion of the universe

The expansion of the universe can be explained without dark energy, lambda. I will show that the expansion of our galactic world can be attributed to the pressure on the plasma from the decay neutrinos. The situation with unevenly distributed fireballs is chaotic. Furthermore the fireballs continuously produced new plasma during the expansion. But a simplified model can be created, where the pre-expansion universe is an original sphere with a uniform temperature. The mass density *m* decreases with increasing distance r from the center, as fewer fireballs are present farther from the centre.

At a certain radius, r_0, the density of cores is so low as to prevent plasma from forming. Farther out is so-called "dark space", where galaxies will not appear. I suppose here that the density *m* of the mass in the particle universe at any given time is a decreasing function of radius *r*, and that it is given by

$$m = m_0 \cdot \exp\left(\frac{-\frac{1}{2}r^2}{r_0^2}\right)$$

where m_0 is the density of the mass in the centre. From here, we can see that at the edge of the core r_0, *m* is only 61% of m_0.

Due to annihilation, a large quantity of neutrinos form, with energy of approx. 30 MeV. The neutrinos represent perhaps ⅔ of the sphere's energy. The neutrinos can collide elastically with neutrons, and their mean energy will be the same as the mean of the neutrons' kinetic energy, likely 40 MeV. Theoretically, for elastic collisions at this energy, we can calculate that

$$\text{effective cross-section} = 1.5 \times 10^{-44}\,\mathrm{m}^2$$

⅓ of the energy density in the sphere is due to neutrons. Dividing by the neutron's energy, we obtain

$$\text{neutron density} = 6.2 \times 10^{41}\,\mathrm{m}^{-3}$$

Multiplying the effective cross section by the particle density, we obtain the number of collisions per meter. The reciprocal value is

$$\text{mean free path of neutrinos} = 108 \text{ m}$$

Since this distance is significantly less than the sphere's radius, the neutrinos must exert pressure on the neutrons, thus causing expansion.

Now, we examine the neutron plasma at the beginning of the expansion. The pressure from the neutrinos can be calculated using the gas law

$$P = \frac{m}{mn} \cdot 60kT = m \cdot 2.2 \times 10^{17}$$

mn is the neutron mass, 1.7×10^{-27}. The factor of 60 comes from the density of the neutrinos, which is approximately 60 times the neutron density, since ⅔ of the nucleons are converted neutrinos. *k* is Boltzmann's constant, 1.38×10^{-23}. *T* is the temperature, 4.6×10^{11}, corresponding to 40 MeV.

We next consider a spherical shell with radius *r*, thickness *dr*, and area 1. We use Newton's second law:

$$-dP = -dm * 2{,}2 * 10^{17} = m * dr * a$$

$$a = \frac{-dm}{dr * m} * 2.2 * 10^{17} = \frac{r}{ro^2} * 2.2 * 10^{17}$$

Remarkably, the density of the mass disappears from the calculation entirely. We can also see that the acceleration is proportional to the radius. This means that the velocities will also be proportional to the radius. This is precisely what Hubble's law says. We are particularly interested in the acceleration at the edge.

$$a = \frac{1}{r} * 2.2 * 10^{17}$$

As this expression is valid at all times, I have replaced r_0 with *r*.

During expansion, the energy of the neutrinos decreases, and it is changed by a factor of r_0/r. In addition, the value of 60 changes, since the density of neutrinos falls in proportion to the density of neutrons with a factor of r_0/r.Thus, we obtain the acceleration at the edge

$$a = \frac{r_0^2}{r^3}\left(2.2 \times 10^{17}\right)$$

We now calculate the work the neutrinos perform on 1 kg at the edge,

$$W=\int_{r_0}^{r_2}\frac{r_0^2}{r^3}\cdot 2.2\times 10^{17}\,dr=\left(1-\left(\frac{r_0}{r_2}\right)^2\right)\cdot 2.2\times 10^{17}$$

Substituting $r_2=30*r_0$ we obtain the approximation W = 2.2 × 10^{17}. At this point the density of the neutrinos was only 2 times the density of the nucleons. The temperature was 1/30 * 4.6 × 10^{11} = 1.5 × 10^{10}, and the energy of the neutrinos was 1.3 MeV. The mean path of the neutrinos was increased by a factor of 30^5. Nearly all processes involving neutrinos had ceased. The neutrinos exerted no pressure, nor did the nucleons have the pressure to bring about any noticeable acceleration.

The neutrinos' work W can be compared with the kinetic energy of 1 kg in the outermost galaxies. Here, the velocity is 7/8*c, and per the relativistic formula, the kinetic energy is then E = 9.6 × 10^{16}. If we now consider that this movement is slowed by attraction from the collective mass of the universe, the initial value of the kinetic energy is E = 1.2 × 10^{17}.

E is approximately half as large as W. We can correct this misalignment by decreasing the number of annihilations, and thus decreasing the factor of 60 by 50%. Another possible correction would involve decreasing the initial temperature of 4.6 × 10^{11} by 50%. A third possibility is that we have incorrectly evaluated the radius of the galactic universe and the velocity of 7/8*c. In other words, we can correct this misalignment by means of a minor correction to these estimated values. The calculation is a simple model. In any case, I consider the calculation as a confirmation that the expansion of the universe results from the decay neutrinos formed in the fireballs. We can compare the explosion in a fireball to the explosion in a supernova.

In the model we have assumed that all the plasma was created before the acceleration period. In reality plasma was produced in the fireballs during the acceleration period. So It is not possible from the model to calculate the duration of the acceleration period.

A field of Kha field was connected to the neutronium spheres in the fireballs. Most of the expanding plasma was outside this field and the particles were surrounded by their own Kha-field known as the field of gravity. The energy density of the Kha field between the particles became smaller as the universe expanded.

Nuclear processes

$$\mathbf{n + \nu \leftrightarrows p + e^-}$$

During the acceleration, the temperature falls, together with the density of the plasma, and we can determine which nuclear processes are taking place. The calculations are the same as those in the Big Bang model. During this important process, an equilibrium comes into place that becomes skewed to the left at high temperatures. The difference between the energy of the neutron and the proton is 1.2 MeV, corresponding to a temperature of 1.5×10^{10} Kelvin. At this temperature, there will be as many neutrons in the plasma as there are protons. This makes possible the formation of atomic nuclei. For example, some protons and neutrons will become helium nuclei. These calculations can explain why a majority of the mass in the universe consists of hydrogen — but also 24% helium.

In figure 3, we can see that the positive up quark and the farthest out negative down quark of the neutron both have a spin of +½. Probably the farthest out down quark, with a charge of -⅓*e*, will react with the incoming neutrino, becoming an up quark with a charge of +⅔*e*. For this reason, the neutral neutrino must give off a positive charge, +1*e*, to the quark; and a negative charge, -1*e*, to the electron.

For the neutrino and down quark to come into close contact, they must have opposite spins. Each spin direction has taken on its own charge. The down quark has a spin of +½, and the incoming neutrino has a spin of -½. The neutrino moves in the same direction as the departing electron, and the electron also receives a spin of -½. So many neutrinos with a spin of -½ are used in this process, that our part of the universe primarily contains antineutrinos with a spin of +½.

The transformation of neutrons to protons continues even today. This occurs when free neutrons decay, and during the radioactive decay of atomic nuclei. The process is likely the same as that shown here. The electrons also receive a spin of -½ by the decays, confirmed by experiments. The neutron is in close contact with the Kha field, in the form of its own gravitational field. Here, every once in a while, the necessary neutrino can be found, though the energy density is quite low.

Traditionally, the decay process is described in terms of quantum mechanics. The associated forces are known as weak nuclear forces. It is supposed that a massive virtual particle W^-, which appears and vanishes rapidly, is involved. This explanation is excessive. The Kha theory gives us a completely new explanation.

Electrons

The freed electrons may have an energy of up to 1.2 MeV, of which 0.51 MeV is resting energy. At a later time, these free electrons can slow down and be captured by free protons, forming hydrogen atoms. In the formation of a proton, a positive field is produced around the proton (cf. figure 4). In the outer hydrogen atom, the electron has melted into the positive Kha field surrounding the proton. This joining can be compared to a quark pair and I will call it a pair of light quarks. See figure 12, to the right. The two rotating fields are drawn side by side, but they exist in the same location. They attract each other because they have opposite charges and the same direction of electrical current. That is to say, a small, single proton does not attract the electron from a distance.

The energy density in the outer atom is not uniform throughout, and it depends on whether or not the atom is excited. In its basic state, the energy density will be greatest near the proton. The force between two quarks in a pair is proportional to the energy of both quarks; that is, the square of the energy 235^2. Similar the force between the electron and the positive field surrounding the proton is proportional to 0.51^2. The ratio of the force on the quark and the force on the electron is $235^2:0{,}51^2 = 2 \times 10^5:1$ Per formula (1) this is in line with the radius of the atom being approximately 10^5 times the radius of the nucleus. The factor 2 probably owes to the attraction of the positive field by the proton.

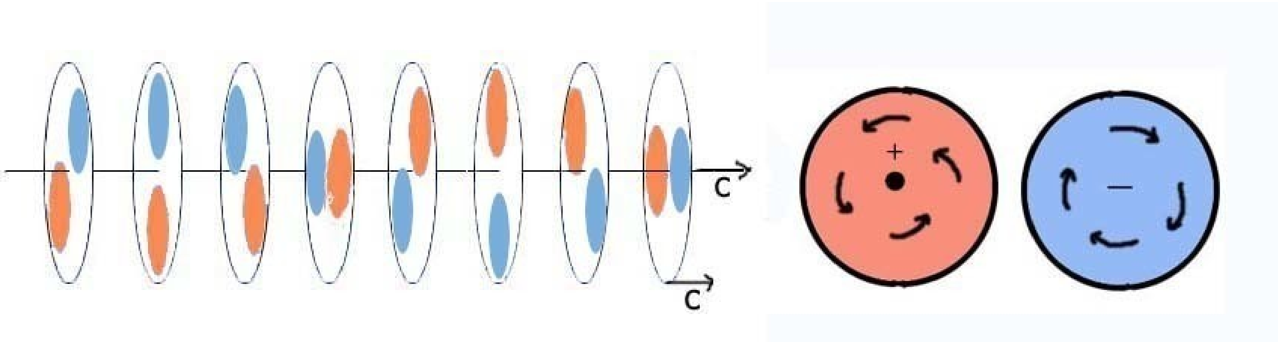


Figure 12 photon and a hydrogen atom.

Figure 12 also shows a photon. Photons are similar to neutrinos. A photon is composed of a helix with a positive charge (shown in red) and a helix with a negative charge (shown in blue). The two helices move together and have the same spin. The photon thus has a positive spin of +1 or -1 and is said to be circularly polarised. If the helices have opposite spins, the photon has a spin of 0 and is said to be linearly polarised. It is possible that neutrinos and photons can be joined or split apart. This is a point of departure from the indivisible light quanta or neutrinos of quantum mechanics. Four neutrinos moving together with the same spin comprise two photons. This description of neutrinos and photons also admits the possibility that some photons we observe can be considered neutrinos, and vice versa. Perhaps neutrinos are not as mystical and difficult to observe as we had previously supposed.

With his equations of 1864, Maxwell showed that light is comprised of electromagnetic waves. He believed that the waves moved through a light-bearing ether. Modern research does not acknowledge the existence of an ether, but I share Maxwell's view, and I call this light-bearing ether the Kha field. Between the photons' positive and negative helices, there is an electrical and magnetic field. This aligns with the fact that it is comprised of electromagnetic waves. Photons react only with electrically charged particles, and hardly played a role in the original Kha field.

The pair of light quarks, figure 12, can absorb a photon, such that each light quark absorbs a helix. When a photon strikes a hydrogen atom, the blue, negative helix can strengthen the negative spin of the blue electron, which means that the electron field is concentrated farther out. The red field has positive spin, which is weakened by the red negative helix. The red field is concentrated farther in. This means that the red field is repelled by the electron's blue field. The electron lies farthest out, and can become completely detached if the photon's energy is sufficiently great.

The attraction between two neutral Hydrogen atoms is commonly described as a covalent bonding of the two electrons. Instead the attraction should be explained as an effect of the neutral Kha field of the Hydrogen atom figure 12. In equilibrium of the atom the total force from the Kha field outside the atom must be equal to the total force from the inside proton. The field strength on the surface of the proton is only the half of the field strength on the surface of a neutron. The total force from outside on the atom will be approximately the half compared to the neutron. Comparing to the attraction of two neutrons we find the attraction of the two Hydrogen atoms to be 80 * $(10^{-15}/10^{-10})^3$. The correction is due to the radii of neutron, 10^{-15} and the atom, 10^{-10}. Multiplying with the radius of the atom we get

H_2 binding energy = $80*(10^{-15}/10^{-10})^3 *10^{-10}$= 5 eV (experimental value 4,5 eV)

All the intermolecular forces, that keep bodies together might be explained in a similar way. The physics of electrons are of immense significance in day-to-day life, but they will not be covered in greater detail here, as they play a minor role in cosmology.

The theory of relativity is wrong

The Kha theory must revise quantum mechanics. The theory of relativity must also be revised. The condition for Einstein's special theory of relativity was that the speed of light c is the same with respect to all observers. This is wrong. The speed of light is always of the same magnitude in relation to the Kha field through which it moves. Experiments have shown that the speed of light in laboratories is the same in all directions and at all times. These experiments were meant to show that light does not move through an ether; however, they show only that the ether or Kha field follows Earth. The Kha field is a gravitational field present around all particles, and which follows these particles. The extension of time and shortening of length also disappear with the theory of relativity.

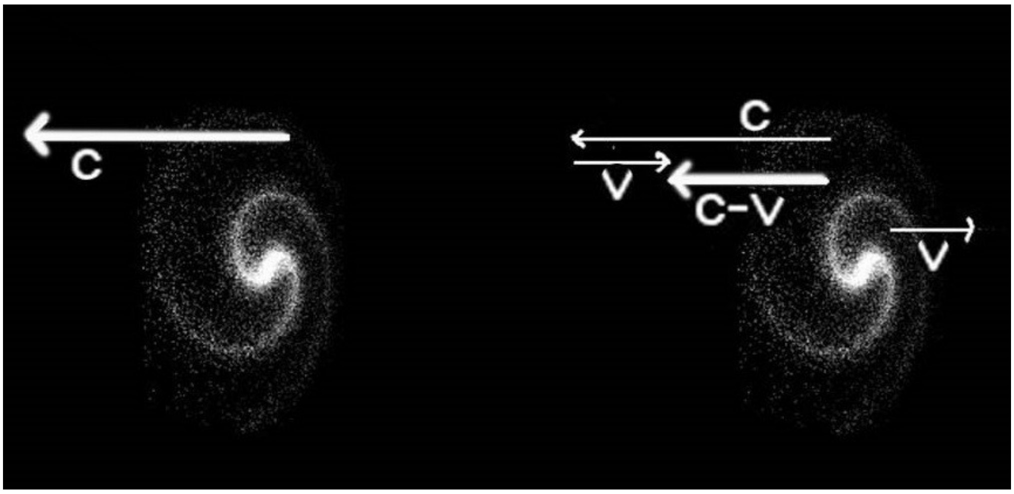


Figure 13. Speeds of light

The Kha field or gravitational field follows the galaxy. To the right we see a galaxy moving away from us with velocity *v*. When the light is emitted from a super nova in the galaxy, it moves at velocity c relative to the Kha field by the galaxy, but with velocity *c - v* relative to us, here in the Milky Way. When the light reaches us, it has velocity c relative to us. The wavelength is "stretched" and increased by a factor of (in this case) 1.5. This is known as the red shift, 1 + *z*. Using the example shown, with *z* = 0.5, we have *v* = 0.33*c.* The relativistic calculation for *z* = 0.5 gives us *v* = 0.38c, which is too great a velocity. This is the reason researchers erroneously believe the universe is accelerating.

The aberration of light is an offset of a star's position in the direction of the movement of the Earth. The aberration can be easily explained: Earth is moving relative to the Khal field following the star.

The theory of relativity's formula for kinetic energy is correct. But the formula can be explained using the Kha theory.

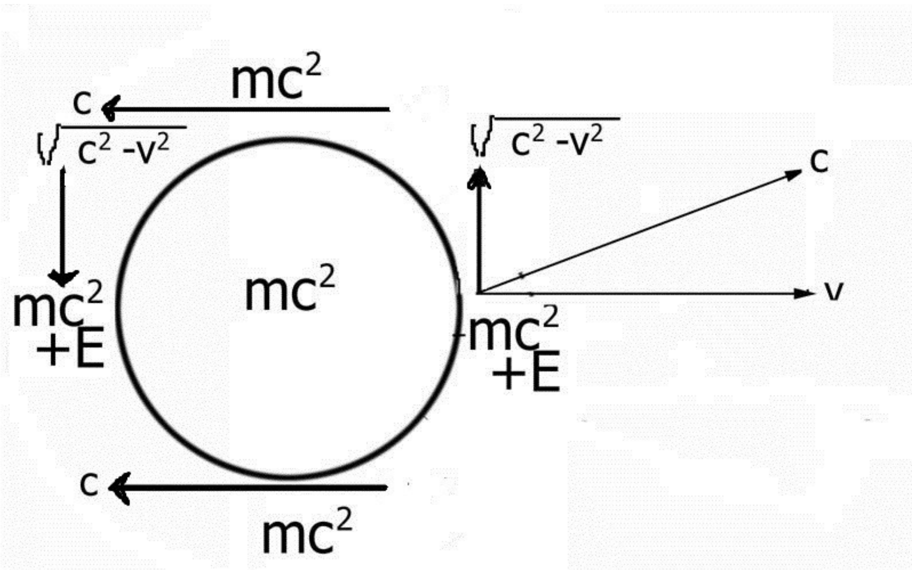


Figure 14. The movement of a particle.

A particle with energy mc^2 is surrounded by a field with corresponding energy equal to mc^2. The surrounding field exerts no resistance. It moves freely at the speed of light around the particle.

When the particle moves at velocity v, the field in front of and behind the particle will have a higher energy content *E*, and move forward at velocity *v*. The energy-rich field in front of the particle can only have the resulting velocity *c*, and in figure 14 we see the two components of the velocity. The component perpendicular to the direction of the movement of the particle is

$$\sqrt{c^2 - v^2}$$

The current velocity at the side of the particle is *c*. Since energy density multiplied by current velocity is constant for a laminar flow, we obtain

$$(mc^2 + E) * \sqrt{c^2 - v^2} = mc^2 * c$$

$$E = mc^2 * \left(\frac{1}{\sqrt{c^2 - v^2}} - 1 \right)$$

This is the relativistic formula for a particle's kinetic energy. When velocity *v* is much less than *c*, the formula becomes the classical formula for kinetic energy.

$$E = \frac{1}{2} m v^2$$

In general, kinetic energy may only be described in this manner. In other words, kinetic energy is not actually contained in the moving object itself. The Kha field through which the object is moving is particularly concentrated in front of and behind the object. This concentration contains the kinetic energy. The concentration of Kha field outside of the moving particle contains, among other things, quark pairs, partons, which can be seen in collision experiments. Those nuclei that appear in collision experiments have much greater energy density than the original Kha field. For this reason, the amount we can learn about the Kha field from these experiments is limited.

Expansion

How does the universe expand? For the sake of simplicity, we will consider the universe as a sphere, with us at its centre. The period of acceleration was rather short. Once the acceleration had stopped, expansion continued in such a way that each particle continued at the velocity which it had achieved at that time. Additionally, that velocity is proportional to the radius (Hubble's law). The achieved velocity may be slowed down, as the universe's own mass attracts its outer parts. We can thus calculate the degree by which the kinetic energy is diminished by an expansion to double the radius. The result is approximately 6‰. In other words, the expansion is slightly slowed, but it will never stop entirely. The expansion continues infinitely.

Figure 15 shows the distance *a* to some galaxies as a function of time *t*. We will ignore acceleration and deceleration. The velocity of a galaxy is constant, so the graph is a straight line. Time 0 is the point where acceleration ceases. The lower graph shows a galaxy with a current distance of 1 billion light-years. The velocity can be determined by observation. It is the slope of the line. It can be seen that the time that has passed since the beginning of this constant expansion is 13.8 billion years. The graph also shows a galaxy with a supernova, with red shift $z + 1 = 1.5$ and velocity v=0,33c. We saw this example previously.

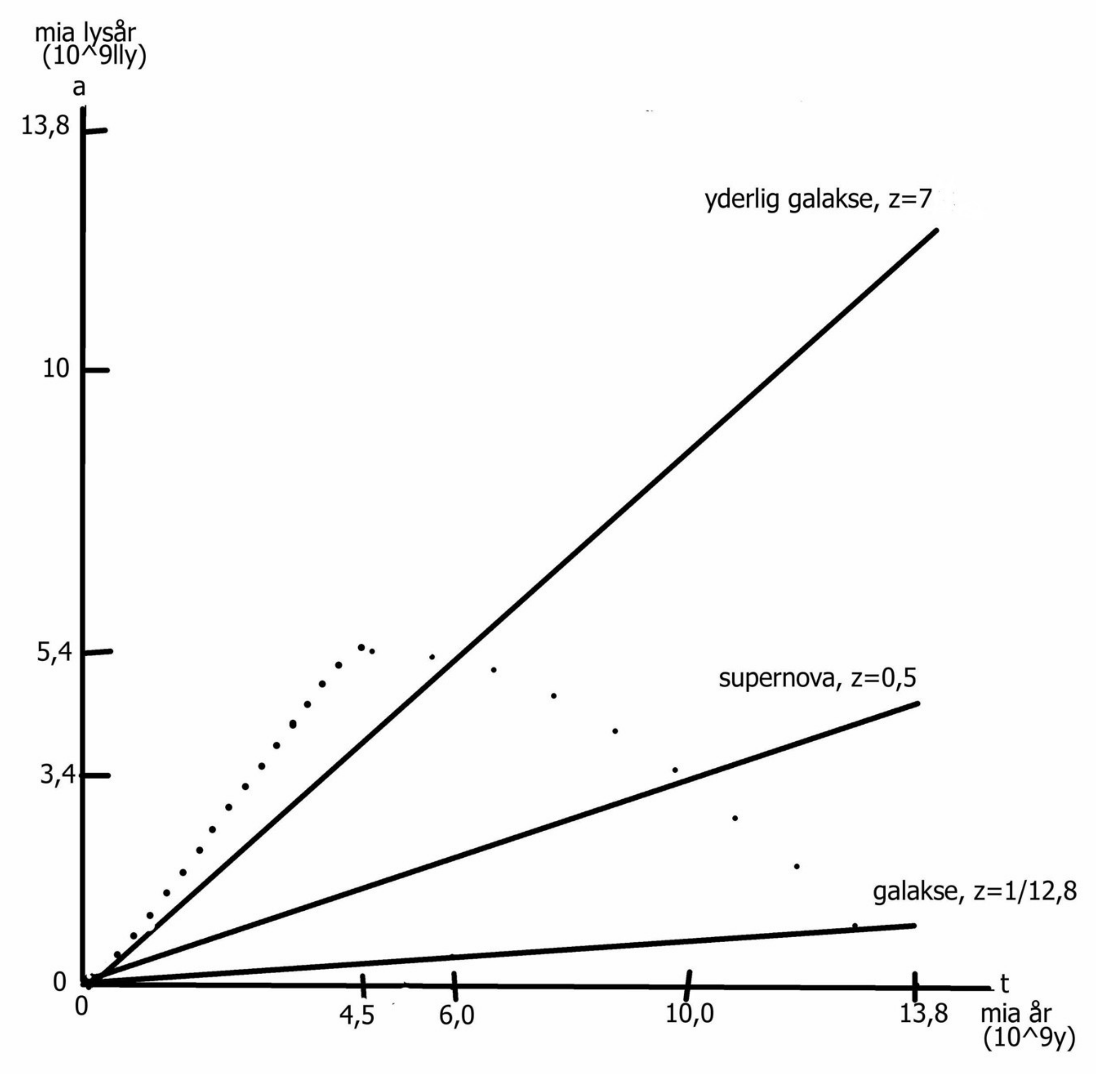


Figure 15

Next, we will graph *a* as a function of *t* for the light we receive from the universe. The velocity of the Kha field is, at any point on the graph, equal to the velocity of the galaxy at that point. The speed of light relative to us becomes greater the closer the light comes to us. A calculation for the light we receive results in the dashed curve. Here, we can see that the previously mentioned supernova gave off its light 10 billion years ago, at a distance of 3.4 billion light-years.

The uppermost graph shows one of the most distant galaxies, with $z = 7$ and a velocity of 7/8*c . We can see that the most distant galaxy gave off its light 6.0 billion years ago, at a distance of 5.2 billion light-years. This is the outermost limit of our world of galaxies, but that limit can vary somewhat in different directions.

Spiral galaxies

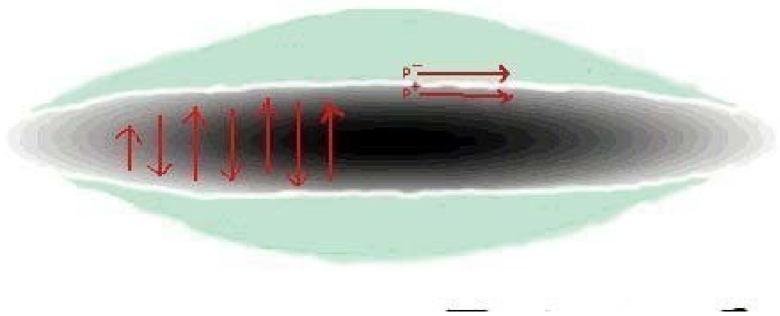


Figure 16

In the Big Bang model, the plasma is uniform and without structure. The Big Bang theory has not quite been able to explain how galaxies were formed. The Kha theory explains how the spheres which became galaxy 'cores', and the fireballs which became galaxies, were formed. Areas between fireballs became intergalactic antimatter.

At the time of the plasma formation, the fireballs exploded at varying rates. Large fireballs exploded first, and were followed by their nearest neighbours. They exist today as galaxy clusters. The pressure of the plasma from the fireballs affected the movement of other fireballs and intergalactic matter. This can explain the rotation of galaxies.

In the plasma containing electrically charged particles, magnetic forces are key. Our everyday electric current is the result of electrons moving relative to a fixed lattice of atomic nuclei. In the cosmic plasma, protons move relative to a cloud of electrons. Magnetic forces can explain why matter and antimatter do not mix. At the border between the galaxy (in grey) and intergalactic space (in green), particles on both sides of the border will participate in the rotation. The movement of the galaxy's protons, and the movement of antiprotons in the intergalactic space, are in the same direction — but the electrical currents are in opposite directions. According to Ampere's law, currents in opposite directions repel each other: magnetic forces keep the two currents separate.

Magnetic forces can also explain why spiral galaxies are flat. Just as with the plasma inside the sun, there were pipe-shaped streams of protons in the plasma galaxy. The current travels in the direction of decreasing proton density; that is, perpendicular to the galactic plane. In this manner, matter is mixed perpendicularly to the galactic plane. Velocities perpendicular to the plane disappear. Expansion perpendicular to the plane ceases. However, the galaxies' diameters continue growing in the gaseous phase. The diameter of the Milky Way is 200 times its thickness.

Due to the rotation and the high density of matter in the plane of symmetry of a spiral galaxy, the gas begins to cluster and form stars. This may occur as early as in the plasma phase, and continues even today. Only certain particles with velocities perpendicular to the radius and parallel to the galactic plane of symmetry, with a size determined by

$$v^2 = \frac{G * M}{r}$$

will continue uninterrupted in a circular path. All other particles will, sooner or later, collide with one of those certain particles and remain stuck there. Only the largest of those particles will be able to maintain their paths following the collision. They will become stars. A similar process takes place in the formation of planets in the solar system. The development of stars has been thoroughly described by many others, so I will not go into detail about it here.

Antimatter

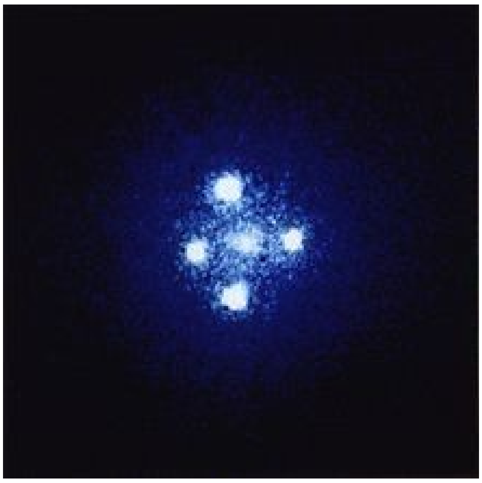


Figure 17. The Einstein Cross

Where is the universe's antimatter? In interstellar space, there is a gas composed of hydrogen and helium, turning about with the spiral galaxy. In consequence of the very low temperature the gas will be found as small droplets. Not much farther out, in intergalactic space, there exists a corresponding gas of antimatter, turning about at the same speed. The two volumes of gas are separated by a thin void. The concentration of anti-gas is greatest near the galaxy, due to gravity. Neither gas is visible, but the antimatter indicates its existence by various means.

The presence of antimatter has been confirmed by observations of highly energised positrons (antielectrons) from intergalactic space. They must have been dislodged from molecules of antihydrogen. Antiprotons have also been observed, likely originating in intergalactic space. In addition, highly energised gamma particles have been observed outside of the centre of the Milky Way. This energy must have come from the annihilation of matter and antimatter.

Antimatter can also be seen in gravitation. It has not been possible to explain the rapid rotation of the spiral arms using only the gravitational force of the galaxy's own stars. There must be gravitational force from other matter near the galaxy; this is what we call "dark matter", but what it consists of is a mystery. We suppose that dark matter is 6 times as massive as the visible matter in the galaxy.

The Kha theory solves this mystery. Antimatter is not evenly distributed throughout intergalactic space. Because the galaxy attracts antimatter, the mass of the antimatter will be greatest near the galaxy. The majority of the dark matter must be antimatter.

The concentration of antimatter is particularly great around galactic clusters. The speed of light decreases in areas of high material density. Namely, the speed of light is lower near a galactic cluster. This explains the gravitational lenses that we see in the bending of light near a galactic cluster. Figure 17 shows the Einstein Cross. Light from a source behind the galactic cluster appears in four places. The reason for the bending of light is antimatter; the gravitational field from the galactic cluster is only an indirect reason.

Gravity waves have been observed, and they are explained by Einstein’s theory of gravity. The Kha theory simply explain them as waves in the Kha field.

The Kha field beyond

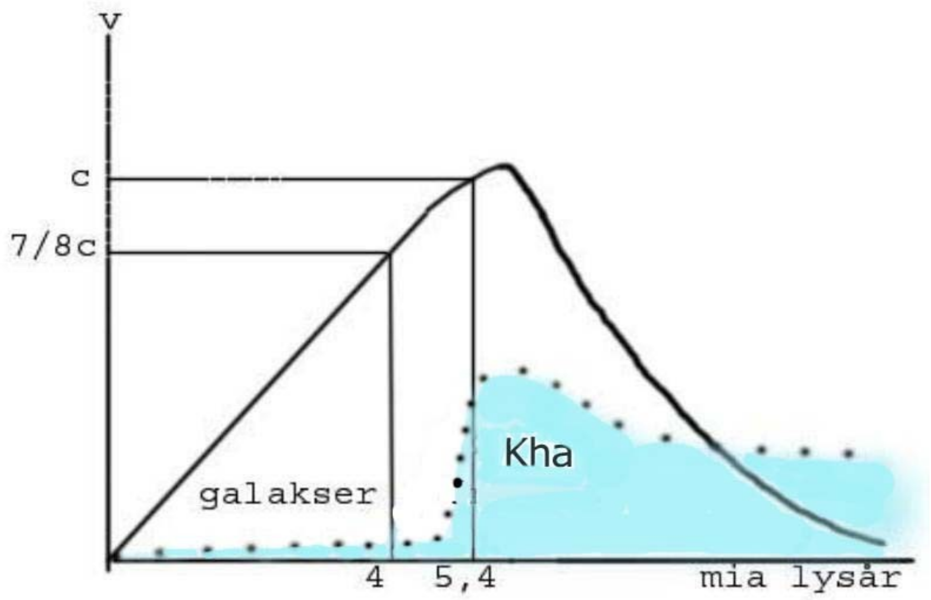


Figure 18.

What is there beyond the galactic universe? A large number of neutrons and antineutrons were annihilated in the fireballs. Many decay neutrinos were formed. For this reason, there was a significant radiation of neutrinos out from the universe of plasma. Outside the particle universe, there was the original Kha field, with quarks, neutrons and antineutrons clustering around spheres of matter or antimatter. This field was irradiated with decay neutrinos from the plasma area. The neutrons were spread by the decay neutrinos. In the course of this, energy and momentum were transferred to the neutrons. The neutrons took on an outward velocity, but quickly dissipated. The distant field thus also took on an outward velocity. This velocity, relative to us, can become greater than the speed of light. Additionally, an increase in energy density takes place in the distant field.

In principle, the figure shows the Kha field's outward velocity as a function of the radius at the time 4.5 billion years (figure 15). In the galactic world, the Kha field consists of the particles' gravitational fields. The galaxies' velocity increases in proportion to the radius, and the Kha field follows. Further out, the velocity of the Kha field continues to increase, surpassing *c* at some point.

In the figure, a probable energy density for the Kha field is drawn in blue. A portion of the Kha field with a large energy density has a greater velocity than *c*. This field will seek to even out differences in energy density by spreading. A lesser portion of the field will lag behind, having a velocity less than *c*. Radiation from this lagging field can reach us. There are virtually no sources of light in the "dark space" outside our galactic world, since the field is thin. However, neutrinos or photons are emitted from the lagging Kha field, where the energy density and temperature are greater.

Far out in space, the energy density of the Kha field ceases to increase. We can assume that the original Kha field continues infinitely, with a constant energy density and a velocity of 0. New particle universes may form long distances away, but observing them will prove difficult.

Microwave radiation

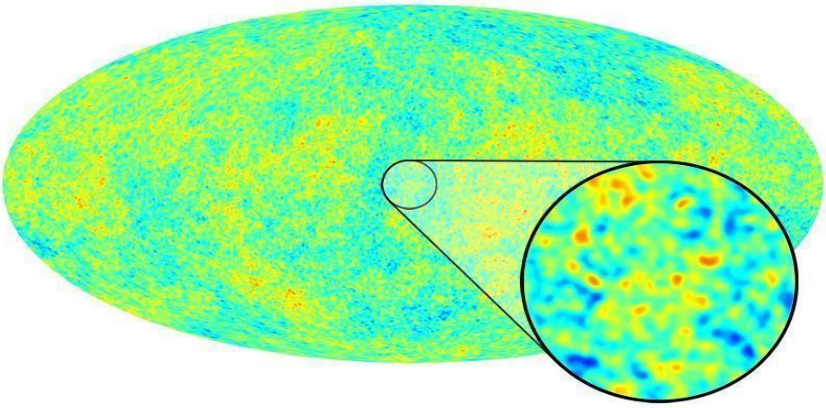


Figure 19

We receive microwave radiation from all directions in space. The intensity of this radiation corresponds to a temperature of 2.7 K. The microwaves must come from the distant Kha field. We can suppose that the temperature of emission was quite high, near the temperature of the original Kha field. In other words, it was very high compared to the temperature of the received radiation. The ratio of these two temperatures is the inverse of the ratio of the wavelengths. The rays' initial wavelength was incredibly small, which fits with the fact that the rays' velocity relative to us has also been quite low. The microwave radiation was emitted from somewhere where the velocity of the Kha field was near c. Many rays were sent at angles to us were deflected toward us in such a way that we can observe them. This makes the picture rather blurry.

A closer analysis of variations in the microwave radiation shows a dipole effect; i.e., a generally greater intensity in a particular direction, and a lesser intensity in the opposite direction. The measured increase in intensity corresponds to an increase in temperature of 0.0035 K. The dipole effect is normally interpreted as a consequence of our galaxy's movement relative to the universe. According to the Big Bang theory, this movement is caused by attraction from other galaxies. According to the Kha theory, from the very beginning, our galaxy was placed some distance away from the centre of the continents, taking on a velocity relative to the centre. Relative to the centre of the universe, we can calculate the red shift $z = 0.0035/2.7$, the velocity $v = 0.00128c$ and the distance to the centre of the universe = 17 million light-years.

High-resolution images have been made possible by the Planck satellite. In figure 19, the blue areas are those with the least intensity. The red and yellow areas have the greatest intensity. However, there is a very small difference in the intensities of various areas. The figure shows this difference, and thus only a small fraction, a ten-thousandth, of the radiation.

To obtain a sharp image, the radiation must be sent directly toward us and not deflected. This occurs where the velocity of the distant Kha field is extremely close to *c*. There, only radiation sent directly toward us will have a small velocity relative to us. This radiation will reach us. The figure's inset shows red areas, corresponding to those areas of the Kha field with a high energy density. The red areas may be located where there are fireballs in the distant Kha field.

The microwave background in figure 19 shows large areas that are mostly yellow. We can consider these to be directions in which large amounts of radiation are emitted from the distant field, and thus where more decay neutrinos from the plasma were emitted. If the universe has developed from two continents as shown in figure 9, the large, yellow areas in figure 19 may suggest such continents.

The galaxies are moving outward. The majority of the Kha field beyond is moving outward at a greater velocity, but the lagging distant field will, probably at some point, be captured by the outermost galaxies. We can speculate as to what will happen when the galaxies eventually encounter Kha field with high energy density. It is possible that the galaxies and black holes will be dissolved.

The Kha theory has thorough and wide-reaching implications for recognised theories in physics. The calculations related to the Kha field in this dissertation are imprecise. More complex calculations can be performed with the help of computers, and it is my hope that someone will take on this task. Similarly, it has not been possible to go into detail with regards to all the consequences of the Kha theory. I hope that other physicists will continue working on the theory. I believe that the Kha theory offers great opportunities to improve our understanding of the universe.

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