

TEMPERATURE RELATIVITY OF A MASS
- The Secret of Antigravitation
in microworld, macroworld and cosmology -

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Abstract. The new developed feature of the mass that, with the change of temperature, it is changed not only in the quantity but also in the quality.

Introduction

This paper presents the new developed feature of the mass that, with the change of temperature, it is changed not only in the quantity but also in the quality. The attractive mass will decrease with increasing the temperature, until it gets the quality of repulsion after going through the massless state. The change of mass from the attracting into the repulsive one represents the fundamental novelty in the mass interactions, and takes them into the natural harmony with all other known interactions in the nature. So, all known interactions in the nature are the attracting-repulsive ones, without exceptions. By introducing the antigravitation in the theory of interactions, the clear and simple way toward the United Theory of Fields is opened.

In this paper, the secret of neutrinos that they react poorly with the matter, is discovered, then it is explained why the cooled down atoms "fall like ripe apples". Also, the series of visible natural phenomena, which prove what is said, is given. Then, a new astrophysics, i.e. new representation of stars and their evolution, is represented. And, finally, the explanation of the much faster spreading of the cosmos, and giving the model of the pulsating cosmos that, naturally, eliminates the Big Bang and Black Holes, is given.

The mass of a body is relative in relation to its temperature.

Relativity of the body mass, in relation to its temperature, is more amazing than the relativity of the body mass in relation to its velocity, which is given by Einstein in his Special Theory of Relativity (STR). According to Einstein's STR, the body mass is increasing from the starting value and aims at the infinity as the speed of body increases and approaches the light velocity.

Temperature relativity of mass is such that the mass can change in the quantity, so that it can increase, and decreases too in relation to the starting value of the mass. And it can change in the quality, so that it will change its

attracting aspect into the repulsive one, or vice versa, going through the massless state or the state of zero-mass. Mass increases with decreasing the body temperature, and it decreases with increasing the body temperature.

Mass interaction is the attracting one, i.e. the gravitational one, only when both masses are attracting, i.e. repulsive, i.e. the antigravitational ones when at least one of them is repulsive. Naturally, the mass interaction between two repulsive masses will be repulsive, i.e. the antigravitational one. The intensity of mass interactions will naturally depend on the quantity of attraction and repulsion of the mass and distance between them, in that way as Newton defined it. Consequently, if we mathematically consider the attracting mass for the positive one, and the repulsive mass for the negative one, then we should always have in mind the fact that for the mass interactions, the logic $(-)\times(-)=(-)$ is valid, and not like in mathematics $(-)\times(-)=(+)$.

The logic of the mass interactions of masses having the same name and masses having different names is completely different from the logic of electromagnetic interactions of electrical charges having the same name and electrical charges having different names or magnetic poles. Mass interactions are in natural harmony with all other familiar interactions in the nature, and they can be attracting and repulsive too, and this fact is of fundamental importance for physics.

This notion and notion that mass interactions and electromagnetic interactions are, naturally, connected by temperature relativity of mass, i.e. the mass, in its essence, has an electromagnetic nature, because the heat, which measure is a temperature, also has, in its essence, the electromagnetic nature, and all leads to the fact that, finally, the United Theory of Fields is really within reach. But if we want that some statement be accepted as a universal truth, its universal importance has to be previously confirmed. If the nature plays the game of the temperature relativity of mass, then it has to be noticed in the microworld, macroworld, and in cosmic relations.

Microworld.

Let consider what happens with the Sun neutrinos. Neutrinos, developed in the inside of the Sun at enormous temperatures, got a great repulsive mass. Since they are in a huge Sun gravitational field, they are influenced by a huge antigravitational force that removes them out and accelerates them. The repulsive mass of neutrinos is a secret of their feature: they almost do not react with the matter. But, by its going away from the Sun, they will cool down slowly, and their repulsion of masses will decrease. At the Earth's distance from the Sun, their mass repulsion is so much decreased that they start to react with a matter, and we can catch them. But, why do we catch much easier more neutrinos coming from above, from the atmosphere, than neutrinos coming from

below, i.e. those coming from the earth. It is simply because of the fact that neutrinos coming through the earth are warmed up additionally and by that they enlarged the repulsion of their masses, and at the same time they reduced the possibility of reacting with the matter. In order to easily notice neutrinos, there is a need to cool them down additionally before coming to a detector, and in that way to decrease the repulsion of mass or even to transform it into the attracting mass. And today, at the present level of technique, it is not hard to realize it in practice.

Now, we can consider the experiments of atoms cooling down done by Claude Cohen-Tannoudji, Steven Chu and William D. Phillips, winners of the Nobel Prize for Physics in 1997. Leading by the logic that the cooling down and slowing down are in fact the same, they cooled atoms using a strong slowing down by a laser. But, they ran into an unexpected problem. At very low temperature, when atoms, in all sense, stop to move, they "fall like ripe apples". Because of that they used lasers which neutralized the gravitation. It is logic that the very cold atoms fall down in the earth gravitational field "like ripe apples", because their attracting mass is increased with the cooling down.

If the temperature is lower, their attracting mass is greater.

If the logic, the cooling down equal to slowing down, is logically expanded to warming up equal to speeding up, then we have the following. During the speeding up of particles in accelerators, their warming up is happened. The warming up provokes the decreasing of the attracting mass. Then after going through the massless state, particles, during great speeds, i.e. very high temperatures, get the repulsive mass. During further speeding up of particles, the repulsive mass of particles will increase. The increasing of particles mass, during their speeding up, was noticed a long time ago, but it was not clear that the repulsive mass of particles increased, and before that the decreasing and disappearance of attracting mass happened. The secret of deeper penetration of speeded particles into the matter, is in their repulsive mass, similarly to neutrinos.

The reason of the lack of success of the controlled fusion in Tokamak is just in the increasing of repulsive mass of electrons and ions with the increasing of plasma temperature. And that is the reason of sudden decomposition of the plasma's ring despite the strong electromagnetic field that tries to sustain it.

Thermal ionization of atoms and molecules is only a demonstration of transferring the mass of one or more electrons from the attracting into the repulsive one. The same situation is in the thermoemission of electrons during the warming up of cathode.

Macroworld

Fire and smoke. The flame rushes up and the smoke too. If the fire is stronger, i.e. the temperature is higher, the flame reaches greater height, and the smoke too. Hot molecules, originated in the process of tempestuous oxidation called burning, which mass became very repulsive, were strongly removed up by an antigravitational force. They become cold very fast emitting the radiation in an infrared and visible part of the spectrum that we see and recognize as the flame. Emitted radiation warms the air and changes the air molecule mass into a very repulsive one, and due to the antigravitational force the hot air molecules were strongly removed up (upward). So, the strong current of the antigravitational movement, i.e. the movement up appears. Molecules originated from burning out, after the radiation emission, go on to move up and leave the flame zone. Soon, they will become cold enough and start to absorb the sunlight. When it happens, we will be able to see them again and follow their movement up, and that is something that we recognize as a smoke. According to Newton's law, the antigravitational force goes down with the height, the same as the gravitational one, and at the same time the molecules become cold which increases their mass in a attractive direction. Therefore, with increasing the height, the velocity of smoke ascending decreases due to the cooling and the smoke that becomes heavier, and in a definite moment on some height, the smoke stops to go up and starts to soar. In that moment, the smoke molecule mass reaches the zero value. With further cooling, smoke molecule masses start to increase in a attractive domain, and the gravitational force of earth, which pulls them down, starts to affect them. Depending on horizontal air streaming, i.e. winds that carry the smoke, cool and heavier smoke will fall down on the earth under the influence of earth gravitation, closer or more far from the place of fire.

Water evaporation. Water evaporates at all temperatures. At lower temperatures, we cannot see the water vapor, but by increasing the temperature of water, the evaporation becomes more visible. If the water is warmed up enough, we can see the movement of the water vapor up, and we can follow it to the certain height. When the water is boiling, we can easily follow how the hot water vapor is going up very fast and reaches the great height. What is happening? Hot molecules of water vapor, which mass became very repulsive under the influence of the antigravitational force, go up. Movement becomes slower with the height due to decreasing of the antigravitational force, and cooling and becoming heavier of the water vapor. If it is a question of a closed space, the water vapor will take the highest position in it, where it will soar for some time, and then, after cooling and becoming heavier, it will fall toward the floor and condense on all surfaces from the ceiling to the floor, and this can be seen in a bathroom after taking a shower with hot water. If it is a question of an open space, the water vapor will, after some time, reach the height at which its

mass, because of cooling, will achieve a zero value, and it will soar like a cloud. With further cooling, the water vapor mass becomes attractive, and under the influence of the Earth gravitation, will start to fall toward the earth surface. If the vapor is condensed into the water in the cloud, then it will rain on the earth. If there won't be the condensation, then the whole cloud will fall down, that usually happens at night when clouds cool down enough, and then in the morning we see a fog. How the Sun warms up the fog, so it will go up again. The whole life on our planet depends on this antigravitational-gravitational game of the Sun with water.

Air warming up. Even children know that the warm air goes up because it is lighter than the cool one. I do not know how long it has been talking about the fact that the warm air is lighter than the cool one, but from now on it must be clear that warm air is really lighter due to the mass relativity in relation to the temperature. The air warming up makes the mass of its molecules, more or less, repulsive, and then they go up under the influence of antigravitational force. The air cooling makes the mass of its molecules greater and more attractive, and then they go down under the influence of gravitation, toward the earth surface. A nice example for that can be flying balloons where the lifting and flying are made possible by warming up the air in the balloon, and by cooling the air, the balloon loses the height. The coolest i.e. the heaviest air always takes the lowest possible position, and the warmest i.e. the lightest one takes the highest possible position. It can be noticed in all closed rooms where we are living and working.

Thanks to the mass temperature relativity, the atmosphere is warming up uniformly, and the earth surface is cooling down.

Due to different warming up of the ground, which is probably the consequence of the appearance and the natural composition of the ground, there is a nonuniformly warming up of the atmosphere air. In that way, regions of more cold air and raised air pressure, and regions of warmer air and reduced air pressure are formed. And then, we have winds, which carry clouds originated above the river, lake, sea and ocean, to water the thirsty ground and make the life on the entire planet possible. So, the Earth writes notes and the heaven musician, the Sun, plays according to them, and water and air dance its tango of life.

Water warming up. The warmed water goes up too and takes the highest possible position, as in the closed systems used by a man, so in the open natural systems. The warmest water is on the surface. That movement in all fluids can be easily noticed when we use the glass container and small but visible and insoluble particles. If the temperature during the fluid warming up is higher, the circulation up in the fluid is more intensive. The fluid, that became lighter due to the warming up, goes up to the surface where, due to the very strong evaporation, it cools very quickly and becomes heavier, and then again falls toward the bottom of the container where it will warm up again, and round

about. That's why all fluids are warmed up by bringing the heat from below. If the fluid is warmed up from the top, then the fluid warming up to the certain temperature will last considerably longer.

Explosion. In our lives, an explosion luckily happens very rarely, but they can be found in movies, especially in movies of action. At all types of explosions, smaller or greater quantity of heat gets free hastily. That hastily freed heat is the cause of appearing the so-called "explosive cloud" which goes up over the place of explosion. The heat originated by the explosion makes the mass of: molecules of arising gases, air molecules and small dust particles very repulsive. The antigravitational force makes them go up as a whirling cloud which can go up as a fire cloud, and then, by cooling down, it can turn into the smoke one, and it can be only the smoke cloud. Because of the decreasing of antigravitational force and cooling down and becoming heavier of the explosive cloud, they will stop on some height where it will soar for some time, and then, by further cooling, will become heavier and fall down on the earth under the influence of gravitation. The most famous "explosive cloud" is the so-called "atomic fungus", which appears after the nuclear explosion, and has the enormous proportion achieving the great height. That is naturally the consequence of enormous energy freed during the explosion, and extremely high temperature achieved in the center of explosion. However, it is not advisable to observe and research the antigravitational movement using the nuclear explosions. The satisfying results can be obtained by observing the wood burning in a fire-place, candle burning, cooking anything in the water and water boiling at that time.

Volcano activities. All of us see, either on TV or in a movie, the volcano from which hatch, the smoke gushes forth. Hot vapor, gases, ashes, soot, which mass became more or less repulsive, are removed up by the antigravitational force. Due to decreasing the antigravitational force with the height and cooling down, i.e. becoming heavier, the smoke will reach some maximum height at which it will soar for some time. When, with further cooling down, its mass becomes attractive, it will start to fall down towards the earth under the influence of gravitation. Those ingredients of smoke which cool down and become heavier faster, will fall down on the earth faster, and their dispersion will not be great, while other ingredients will reach the greater height and will stay longer in the air, and because of that their dispersion will be much greater.

It is possible to mention many examples of antigravitational movement. But the temperature relativity of mass explains us that is always a question of a closed cycle. If we notice the gravitational movement, for example the raining, then it means that the antigravitational movement precedes, i.e. the water evaporation and clouds formation, and from where the water is in the air to fall down. And all goes around, gravitation, i.e. the rain and antigravitation, i.e. the water evaporation. The same is with the fire and smoke, the antigravitation is

when the flame and hot smoke go up, and the gravitation is when the ashes, soot and smoke fall down cold on the earth.

For the end of experimental argumentation, there is a small sweet. All of us know how the candle flame looks like. The candle flame has the form of a very elongated small cap whose symmetry axis is vertical, and it is orientated with a sharp tip upward. No matter how the candle is turned, the flame will always keep the same form, the vertical symmetry axis and the same orientation upward. When the man, thanks to the technology improvement, not only makes a stride step into the universe, but also allows himself to have fun at this occasion, he has even lighted up the candle in his provisional weightless home. The lighted candle, in the weightless space, burns with a flame, which has a form of regular ball, and it doesn't matter how the candle is turned, because the logic up-down is not valid there. That interesting thing could be seen in newspapers at the beginning of 1999. But this interesting thing points at a very important thing.

All thermal movements in the gravitational field has the same direction as the gravitational movement, i.e. the vertical one, but the direction of thermal movements is opposite to the direction of gravitational movements, i.e. the direction is orientated upward. So, all thermal movements are, in their nature, the antigravitational movements. This can be acknowledged in considering the temperature influence on almost all substances regardless of the physical condition in which they are. It is commonly known that almost all solids extend during the warming up, i.e. they enlarge their cubic capacity, and the same is for the fluids and gases, and the cooling down provokes the decreasing of cubic capacity, i.e. gathering.

The gathering is a natural consequence of gravitational influence in the scope of the observed system, and the expansion is then, logically, conditioned by the antigravitational influence in the scope of the same system. Each compression provokes the increasing of the system temperature, which is most obviously at gases, and the expansion provokes the decreasing of temperature. In both cases, the reaction has an effect that tends to annul the effect of action, i.e. the warming up faces the compression, and the cooling down faces the expansion.

It can be concluded from all that the whole thermodynamics is in fact the physics of antigravitation. In other words, gravitation and thermodynamics are natural and inseparable pair when we consider interactions between masses.

My experiences coming from my discussion with colleagues show that physicists firmly stick to the fact that the cause of any movement up is the force of thrust, i.e. Archimed's law. Unfortunately, their such conviction is the consequence of wrong approximations that introduced a long time ago to explain, by the Archimed's law, phenomena that, in their essence had the

temperature mass relativity. Assigning the Archimed's law to a proper place and its complete essential explanation will be the subject of one of my next papers.

Astrophysics.

The real sources of energy in the cosmos, i.e. stars, should be observed. Stars are the greatest sources of the gravitational field, because the greatest part of attractive mass of the universe is centered in them. Having in mind their nature, they are the best indicators of antigravitation because they are, at the same time, makers of the repulsive mass. In order to understand what happens on stars, it is enough to examine what happens on the star Sun, which is the nearest star to us.

Let's consider something very interesting. The temperature of photosphere is about 5800°K . By transferring from the photosphere into hromosphere, the temperature increases very fast achieving the tenth thousand degrees. Hromosphere is much more dynamic than the photosphere with the intensive turbulent movements. Speckles are the component of hromosphere in the form of vertical fibers, which live short, from 20 sec to half hour, and they are of different heights, on an average about 3000 km. Corona is consisted of the mixed system of rays and curves with the fiber structure. Temperature in the rarefied gas of the corona increases to some million degrees, and the spectrum consists of the continuity (continuum) and emission lines of highly ionized elements. Corona is continuously spreading in the outer cosmic expanse, and in that way it makes a sun wind, which at the earth distance from the Sun has the speed of 400 km/h. Why is it so? Why does the temperature drastically increase with going away from the photosphere toward the corona, instead to decrease? The answer is the following: due to the temperature relativity of the mass and antigravitation.

The Sun ejects the red-hot matter from the inside to the photosphere where it cools down by evaporating and again sinks backwards. This evaporated matter, because of the high temperature, has the very repulsive mass that is in the very strong Sun gravitational field, and above the very surface of the Sun. This simply means that the enormous antigravitational force will start to influence it, and it will give an enormous acceleration to that matter. That antigravitational acceleration of gas matter is the cause of the fast increasing of temperature in the hromosphere to some tenth thousand degrees.

Fiber structure of the hromosphere and corona is the direct consequence of the structure of the photosphere. Photosphere is of the granular structure where some granules are warmer and some are colder. Evaporations are much more intensive from the warmer granules, and the antigravitation converts them into the beams that remind us of fibers. In these gas beams, the strong antigravitational accelerations, many interacting collisions appear, and they

provoke the sudden increase of temperature in the hromosphere and corona, as well as forming of heavy metals that are highly ionized due to conditions where they developed.

By spreading and getting away from the Sun, the overheated and speeding up matter of the corona cools and slows down due to the decreasing of the antigravitational force and the mass repulsivity, and transforms into the so-called Sun wind. The ionization of the Sun wind elements is also decreasing.

After all mentioned above, we have to make the completely different thinking (picture) of the stars.

Stars use their fuel very economically in the processes happening in their inside. The temperature in the stars inside is surely higher than the photosphere temperature, but not so drastically, because the processes of making energy are slow. Stars are made of the dense red-hot fluid that, mainly slow and with the weak oscillations of the intensity, boils. When the star boiling is not slowly and uniformly, we notice it as a super-new one, when due to the hasty warming up of the star, the hasty evaporation of its material is happened. Due to the enormous antigravitation, its material was got out into the surrounding space, and the star, after some time, slows down again. The similar situation is with the pulsars. In any case, the enormous energy, emitted by the stars into the surrounding space, comes from the great potential energy of their gravitational field.

Since the stars are very wise creators of energy, as well as heavy metals, using their gravitational field, and using their fuel very economically, it is clear that their lifetime is much longer, and the process of their evolution is very slow. That means again that the whole universe is much older than we think it is. Now, we can say something about the cosmos.

Cosmology.

The latest researches came to the discovery that the universe does not only spread which is known long ago, but it is spreading faster and faster. How can it be explained the fact that the universe is increasingly speeding up in its spreading instead to slow down in its spreading? After all mentioned above, this can be easily explained.

Numerous stars in the galaxies emit their winds, and galaxies, as stable objects, which are stable due to the gravitation, emit their galaxy winds. Since the galaxy winds consist of particles with the repulsive mass, it simply means that the concentration of repulsive mass in the intergalaxy space is constantly increasing. And just that constant increasing of the repulsive mass in the intergalaxy space provokes the faster spreading of the entire cosmos. That is the essential cause of the validity of Hable's law for the universe spreading.

The repulsive mass is the synonym for the high temperature that means that the universe is placed in the process of warming up. On the other hand, the universe is cooling down by the spreading. What is the destiny of our universe?

The destiny of universe completely depends on the star evolution. At this moment, the universe is spreading faster and faster, and it will last until the stars "work hurriedly". When the stars begin to go out easily, the decreasing of the speeding up of the universe spreading will happen. Then, the uniform universe spreading will occur, and after that the universe spreading will start to slow down, i.e. the universe will start to cool down. The process of cooling down will decrease the value of the repulsive mass, and increase the value of the attracting mass in the intergalaxy space. The growing gravitational attraction will, at one moment, stop further spreading of the universe, and it will be in the state of its space maximum. At that time, the universe will be very, very dark because the stars will be either gone out or at their last gasp. The gravitational attracting will then start to gather the universe, slowly at the beginning, and then faster and faster. After that, the process of repeated becoming heavier of the gone out stars will start, because they will then absorb, by their gravitation, the attracting mass of the contents of intergalaxy space. And new stars will be formed too.

The becoming heavier of died stars will lead to the beginning of their warming up, and after gathering a definite critical mass, their renewed lighting up will happen. That lighting up, of gone out and completely new stars, will lead to the repeated occurrence of the repulsive mass in the universe that will cause the decreasing of the speeding up-gathering of the universe. As the number of lighted up stars increases, so the value of the repulsive mass will increase. That will provoke the universe transferring from the hastened gathering into the uniform gathering, and then into the slowed down gathering. When the number of lighted up stars gets at its maximum and the value of the repulsive mass gets at the needed value, the universe will be stopped in its gathering, and then it will be in the state of its space minimum, and that certainly will not be any singularity. The universe will be at that time very, very bright.

After that, the universe will start again to spread, firstly very slowly, and then faster and faster, and it will be in the same state as it is today.

And the universe will continue to pulsate in the eternity between its bright minimum and its dark maximum, just like Heraclitus described by the following words: "The world was, is and will be the eternally live fire, that burns according to the specific laws, and extinguishes according to the specific laws."

That approach of pulsating universe can be found in the oldest written document of the eastern wisdom that succeeded to comprehend it so long ago.

In the essence of all, the top-level game of nature to change the mass in the quantity and quality, depending on the temperature, can be found. In that way, the nature protects the whole matter and creation from the destroying and decay.

Now, it is clear that there was neither any Big Bang nor it will ever be. Also, it is clear that the state of matter called the Black Hole is not possible too.

In order to comprehend what is really going on with the matter during these changes, more time, more experiments and much more common logic will be needed. That understanding will change the present physics, but we have to pace forward bravely toward the complete truth.

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