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The Primordial Matrix

Alexandra Gauze

1 bis rue Jean Mermoz, Roquettes 31200, Haute-Garonne, France.

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***Corresponding author:** Alexandra Gauze, 1 bis rue Jean Mermoz, Roquettes 31200, Haute-Garonne, France.

Abstract

This paper proposes some new theoretical ideas to get to the overall mechanics of the Universe. This model is mainly based on the fact to consider the vacuum as a material in its own right. The material that governs the structure of the Universe, in the form of an orthogonal meshing held in place by the electrostatic force. This material is called the primordial matrix. Furthermore, the primordial particle that makes up this structure is the positron, the anti-electron. This idea implies a model in which the antimatter is much more abundant than the matter. Besides this is a model in which the matter and the energy are only generated by the global motions of the Universe (Big Bang, expansion, and Big Crunch). The model described here includes a mechanism explaining the electromagnetic wave propagation in the interstellar vacuum, a place for the dark matter and the dark energy, and then an explanation of the Big Bang and the Big Crunch inside a Closed Universe.

Keywords

Overall Mechanics; Primordial Matrix; Closed Universe; Electromagnetic Wave Propagation; Vacuum; Antimatter; Positron; Electron

1. Introduction

The Quantum Vacuum, the General Relativity, and the existence of black holes seem to presage that the cosmic vacuum is not empty. That the vacuum has a consistency that makes it deformable, and that it could spontaneously cause particles's appearance or disappearance. In addition, the electromagnetic wave can propagate in the interstellar vacuum, which is paradoxical. To answer these paradoxes, this study proposes to consider the vacuum as a material. This material is named the primordial matrix. Here you will find the original idea, the theoretical characteristics of this material and what it implies for the global model of the Universe.

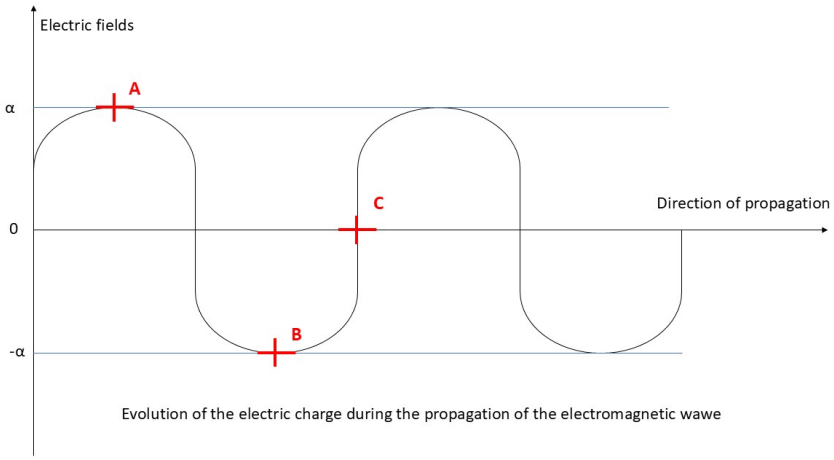
2. Definition of the Model

2.1 The Duality Wave/Particle of the Light

The light can be described as both as a wave, the electromagnetic wave, and as a particle, the photon. How to explain this duality? Here we consider that the wave could express the changes of the particle's state during the propagation. We study the electric field curve at some remarkable points. And we interpret what this indicates about the state of the photon at each point. Each point studied corresponds to a theoretical state of the photon at rest.

3 particular points of the curve are observed:

- The point A is the highest positive value of the electrical charge. At this point the photon would be a positively charged particle.
- The point B is the highest negative value of the electrical charge. At this point the photon would be a negatively charged particle.
- The point C has a zero value of the electric charge. At this point, the photon would be an uncharged particle.



Evolution of the electric charge during the propagation of the electromagnetic wave

As a conclusion, we suppose that the photon could be a particle which oscillates between different states with a variation of the electric charge (alternance + 0 - 0 + 0 -). When we observed a given interval of time, however short, the photon behaviour looks like a wave due to its cyclic electric changes. If the photon could be observed at a specific point in the space and the time, it would theoretically look like an elementary particle with a defined electric charge, either positive, negative or neutral. We can also consider that we are not dealing with a continuum but with jumps between positive and negative values. We consider, for example, jumps between a positron and an electron: 2 "twin" particles with opposite electric charge. We have that kind of alternation:

positron - electron - positron - electron ...

2.2 The Positron Sea Of Paul Dirac

We propose here that the fundamental matrix of the Universe could literally correspond to a sea of positrons, based on the work of Paul Dirac to describe the Quantic Vacuum [1].

It is necessary to imagine a positron meshing. The positrons held equidistant from each other by the repulsive electrostatic force, because all particles have a positive electric charge. This model implies that the positrons have a tidy, orthogonal organization at rest.

But this meshing is imperfect. If the matrix moves, the distances between the positrons can be modified. Indeed the matrix moves with the Universe expansion for example. In this case, an additional gap of the same order as the size of a positron would appear into the meshing : it must correspond to an electron (same size as the positron and negative charge).

It is postulated that the meshing must spontaneously tend to return to its state of equilibrium by filling the gaps. One of the adjacent positrons will take the place of the missing positron. This action creates a new gap, which will be filled too. And the reaction spreads from one to the next. This creates a disturbance from near to near in the matrix, that is a wave.

This disturbance implies a cyclic reversal of the electrical charge and that kind of alternation:

positron – electron – positron – electron ....

In other words, a wave that moves in the fundamental matrix of the Universe (the vacuum) and which results in an oscillation between positive and negative electric charges. It can correspond to an electromagnetic wave. This model implies that the most fundamental force would be the electrostatic force and that the most fundamental particles would be the positron and the electron.

2.3 Dark Matter, Big Bang, Inflation and Dark Energy

Two opposite hypotheses are confronted here in order to describe the Pre-Big-Bang Universe:

- Hypothesis 1: The pre-Big-Bang is a singularity

- Hypothesis 2: The pre-Big-Bang is not a singularity

2.3.1 Hypothesis 1: The Pre-Big-Bang Is a Singularity

In this case we consider a primordial photon with an infinite energy, in a zero space and a zero time (It corresponds to an electromagnetic wawe with a zero wavelength, and an infinite frequency). Then the photon divides, alternating cascade between particle pairs (matter/antimatter pairs) and lower energy photons [2].

The space-time is expanding, it's the Big Bang and then the inflation. The total energy of the system is retained. It dilutes in the space-time while it stretches. New particles have less and less energy. The Universe extends to infinity, diluting all its energy. It is an open Universe. That model seems to work, but what about the dark energy and the dark matter?

2.3.2 Hypothesis 2: The Pre-Big-Bang Is Not a Singularity

In this case we consider a starting space-time that is very small, very condensed but which has a value. With a very great, but not infinite, starting energy. We must imagine the space-time, the fundamental matrix as a flexible and hypercondensed material (in the idea, it can be compared to a spring). We imagine the dark matter as a supercondensed fundamental matrix with a very high mass and potential energy. Imagine a spring contracted: if you let go of it, the spring stretches at once. If we imagine the whole matrix of the universe condensed under stress (by a previous Big Crunch), then it will tend to unfold: it is the Big Bang.

In this model, the energy contained in the hypercondensed matrix just before the Big Bang would correspond to the dark energy and it would be released as the Universe relaxes, as the inflation proceeds. Thus there would be exchanges between a form of energy contained in the condensed matrix (dark energy) and a form of kinetic energy that causes the Universe to expand (spring tension). By staying in the metaphor of the spring, we can imagine a maximum expansion when the whole matrix has been deployed and stretched to its maximum. The elastic force will then push the Universe to recondense, which causes a Big-Crunch. We end up with a perpetual cycle in a closed system where the total energy is conserved, that is a closed Universe. A closed Universe as the description of Stephen Hawking [3].

The biggest question raised is what causes Big Crunch at the particle level ? When the mesh is stretched to the maximum, the gap between the positrons becomes such that a lot of matter appears in the holes of the meshing. The electrons and the positrons are then attracted to each other by the attractive electrostatic force, because the electric charges of the particles are opposite. Then the Universe collapses: this is the Big Crunch.

For this article, the hypothesis 2 is retained because it offers an exit for the dark matter and the dark energy. Besides, the hypothesis 2 is better suited to the model witch is proposed here.

2.4 The Gravity

Concerning the definition of the gravity in this mechanics, we base this model on the principle of the General Relativity : the mass of the bodies curves the space-time [4]. This principle is adapted to the primordial matrix model. This behavior corresponds to the theoretical stable form of the primordial matrix.

We can imagine that the matter is systematically heated by the ambient antimatter and that there is a form of fusion of the matrix around the bodies of matter in the form of electromagnetic waves. (Photons are considered as the transition between matter and antimatter.) The bodies of matter can therefore tend to slide towards each other if they are close enough. The matrix's structure around it being rigid, then the matrix between the 2 bodies must be more malleable, which favors movement in this direction: the 2 bodies fall towards each other because this is what poses the least constraint on them, rather than moving in another direction by deforming the matrix where it is more rigid.

To go further, we can imagine that the heavy matter requires complex windings of the matrix, what stabilizes it in the matrix and prevents its movement. This is why it is the least heavy object that will move the easiest.

Besides, based on the study of Gabriel Chardin [5], it is envisaged that the arrow of time for the matter can be reversed compared to the antimatter. This would explain why the deformation of the matrix by the matter is a deformation along the time axis, as described in the General Relativity.

2.5 The Matrix in Motion

In the mechanics proposed here, we suppose that an electron (= matter) corresponds to a hole in the positron meshing (= antimatter) which constitutes the matrix of the Universe. This matrix is what we perceive as the interstellar vacuum.

From the point of view of the antimatter, to represent the particles of matter we can imagine bubbles more or less large that can stick together, or fuse. This could be caused by the boiling, the friction of the matrix, just after the Big Bang.

Just after the Big Bang we must imagine that the matrix undergoes enormous frictions and that part of it founds on a plasma, promoting the fusion of elementary particles - electrons or positrons first, then quarks, etc... The positrons and the electrons have a mass of about 0.5MeV while the smallest quarks, quarks UP have a mass between 1.5 and 3 MeV. If we consider the positron as the elementary constituent of the basic matrix, it is conceivable that each quark could be a deformation of this matrix, as a fusion of several electrons.

With the expansion of the Universe, the phenomenon becomes more and more discreet and these bubbles of matter are dispersed in the matrix. The windings of the antimatter's matrix form the surface of these bubbles. When some matter bubbles stick together, then when the matter becomes heavier, we have to consider that the surface around the matter should become more and more complex.

The electron cloud of the atoms is not insignificant in this model, it is considered here as a disturbance, or even as a form of flow around some matter, between matter (= atomic nucleus) and antimatter (= vacuum). This raises a question: In the electron cloud of the atoms, are we permanently dealing with electrons ? Or are we dealing with an alternantion of electrons, positrons, and then some photons?

In principle, according to this model, the matter is diluted in the Universe and it should have a tendency to be annihilated by the ambient antimatter passing through a stage where the remaining isolated particle of matter produces an electromagnetic wave before disappearing, respecting the equation $E = mc^2$ [4]. The primordial matrix then regains its equilibrium state: a stable positron meshing. Until the next disturbance since we are in a perpetual cycle Big bang/ Big Crunch.

2.6 A Mathematical Relation Between the Uncertainty Principle and the General Relativity

2.6.1 Planck-Einstein Relation [6]

- $E = h.f$
- E: energy (J)
- f: frequency (s^{-1})
- h: Planck's constant = 6.629. 10^{-34}J.s
- t: time (s)
- $E = h/t$
- $h = E.t$

2.6.2 Werner Heisenberg's Uncertainty Principle [7]

- $\Delta x.\ \Delta p \geq \frac{h}{2}$
- Δx: Δ position (m)
- Δp: Δ momentum (kg.m. s^{-1})
- h: Planck's constant (J.s)
- m: mass (kg)
- Δs: Δ speed (m. s^{-1})

- $\Delta x.\ \Delta p \geq \frac{h}{2}$
- $2.\ \Delta x.\ \Delta p \geq h$
- $2.\ \Delta p.\ \Delta x \geq h$
- $2.m.\ \Delta s.\ \Delta x \geq h$
- $2.m.\ \Delta s.\ \Delta x \geq E.t$
- $2.m.\ \Delta s.\ \Delta x.\ (1/t) \geq E$
- $2.m.\ \Delta s^2 \geq E$
- $2.\ \Delta s^2 \geq E/m$

2.6.3 Albert Einstein's General Relativity [4]

- $E = m.\ c^2$

- E: energy (J)
- m: mass (kg)
- c: speed of the light in the vacuum (m. s^{-1})
- E = m. c^2
- c^2 = E/m

2.6.4 Relationship

- Werner Heisenberg's Uncertainty Principle : 2. $\Delta s^2 \geq$ E/m
- Albert Einstein's General Relativity : c^2 = E/m

- 2. $\Delta s^2 \geq c^2$
- $\Delta s^2 \geq c^2/2$

As a conclusion, the velocity delta of a particle must be greater than or equal to half the speed of propagation of the light in the vacuum, in the primordial matrix. We can imagine that the speed of an elementary particle displacement into the matrix must be very hight when there is a disruption. Indeed, the displacement of an elementary particle at the scale of the matrix must imply the appearance of an electromagnetic wave. The electromagnetic wave that requires a particle matrix to propagate. This can explain the particle / wave duality. The Uncertainty Principle and the Relativity seem to be compatible. Futhermore, the Quantum Mechanics and the Relativity seem to be compatible.

3. Conclusions

In summary, here are the estimated characteristics of the primordial matrix described. The interstellar vacuum is considered as a material. This material would be made up of some positrons held in place on an orthogonal meshing by the repulsive electrostatic force. It is envisaged that a hole in this antimatter meshing would represent a particle of matter, an anti-positron, therefore an electron. This model helps to explain the propagation of the electromagnetic wave in the vacuum. This model is compatible with the principle and the topology of the General Relativity. It also makes it possible to explain the role of the dark matter and the dark energy, by considering the principle of a closed Universe, as described by Stephen Hawking.

The existence of the photon as a particle can be questioned : here, a photon at rest would be a particle of matter or antimatter and more likely a positron or an electron.

According to this model, we live in a Universe of antimatter. The matter that gives us life is like an artefact born of the friction of the matrix between its movements of expansion and collapse.

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