

## Electric charge – a different approach

### **Abstract:**

It is a parallel theory with the one of quantum mechanics, and is trying in an approximately-simplistic manner to describe the world of atomic processes.

Starting from the similarity between an electric field with a gravitational field, it is demonstrated why (and how) the elementary electrical charge has this value.

**Keywords:** elementary electrical charge - it is one of the basic properties of matter, which indicates a fundamental property of the fundamental particles; physical field – fundamental notion to explain the transmission of interactions from close to close, and from a distance; space-time – space and time seen as components of a single four-dimensional space-time system; inflation – astronomy (General relativity) ; mechanical work – a form of energy exchange (changing the dynamic state of the system); oscillation(vibration) – energy transformation from one form to another;

## I. Introduction:

In general we find many articles relating to (and about) electrical charge, but nowhere does it say from where it has this value, it's being considered an intrinsic property of elementary particles.

( It will be considered as elementary particles, only those particles that have a "real existence", namely, those which have a bigger life of, let's say, 5 min, – therefore, the electron, the proton, and the neutron – *the other particles live such a short time, disintegrating almost instantaneously after it's being formed, so that we do not know if it can be considered particles or only "resonances" (oscillations) of determined energy*[6].

"Confusion" between the action of an oscillation with the action of a "mass", we find it in Einstein's famous formulas of the energy, namely  $\epsilon = mc^2$  and  $\epsilon = hv$ . Describing the energy, they can be considered equal, ie  $mc^2 = hv$ . But we notice that on each side of equality there is a constant and one variable. So, by reducing constants, which are always the same, the variables will remain, that is  $m \approx v$ , which means that the action of a mass, in our case of a one particle, can be confused with the action of an oscillation, and vice versa.

It is also known that the proton and the neutron have an internal structure (quarks), but they are considered in all experiments as the standalone particles [1], therefore this is how they will be considered also in this case.)

## II. Basic Ideas:

In this material is starting from the similarity between electric field and the gravitational field, and without contradicting or entering into conflict with quantum mechanics, it will explain "why" the elementary electrical charge has this value.

Between the gravitational field and the electric field, both with sources at rest, we will find the following:

### - similarities:

- the mathematical formulas of the two physical fields (of the fields forces) are similar – directly proportional with the masses (respectively with the electrical charges) and inversely proportional to the square of the distances [3];
- the intensities of both fields are described by similar mathematical formulas;
- and I would add, as manifestations of the fields:
  - different masses have the same gravitational acceleration (it moves identically in the field) [2] [4];
  - different masses (the electron and the proton) have the same electrical charge (as a value) [1];

### - differences:

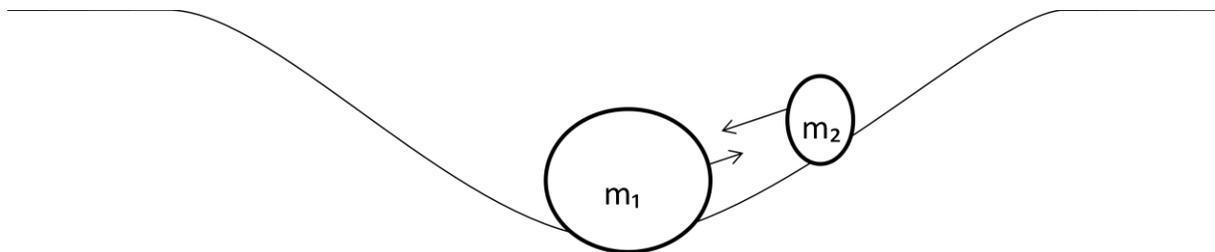
- gravitational forces are just attractive [2];

- electric forces can be both attractive and repulsive [6];

### III. Background of the study:

Since the similarities between the two fields are very high, it will apply what is known about the gravitational field [2], and to the electrical field, namely, to give it to the latter, a form which will be described by space-time geometry.

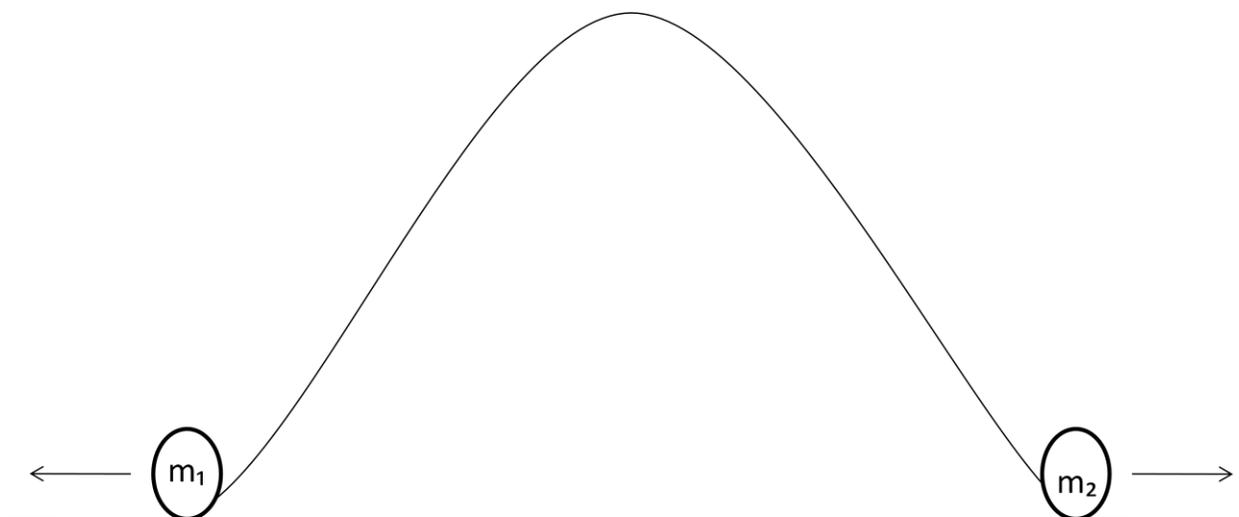
If we were to simplistically interpret the gravitational field (which is just attractive), in the presence of the masses [2], the geometric shape of the space-time curve would be (let's call it positive curvature – downward) as in fig.1.



**Fig.1:** Simplistic interpretation of the gravitational field (which is only attractive) in the presence of the masses.

(Drawing executed by M.A.)

Attempting to give a geometrical shape to the electric field too, we have the model for attractive force, the one from fig.1, but for the repulsive force we should have a negative curvature (let's call it upward) as in fig.2.



**Fig.2:** Simplistic interpretation of the electric field, for the repulsive force. We should have a negative curvature (in the presence of the masses).  
(Drawing executed by M.A.)

But how would make the space-time pass from the positive curve (downward) to the negative curvature (upward)? How would "feel" space-time that it has to do with electrical charges of the same kind, to change its curvature? What would be the process of changing the curves? Or is there another way of explaining the part of the repulsive forces? Is there another phenomenon capable to explaining repulsive force?

Yes, there is a phenomenon that it manifests itself throughout all the Universe and it influence all outerspace bodies. It's about the universe's inflation [2][3][4].

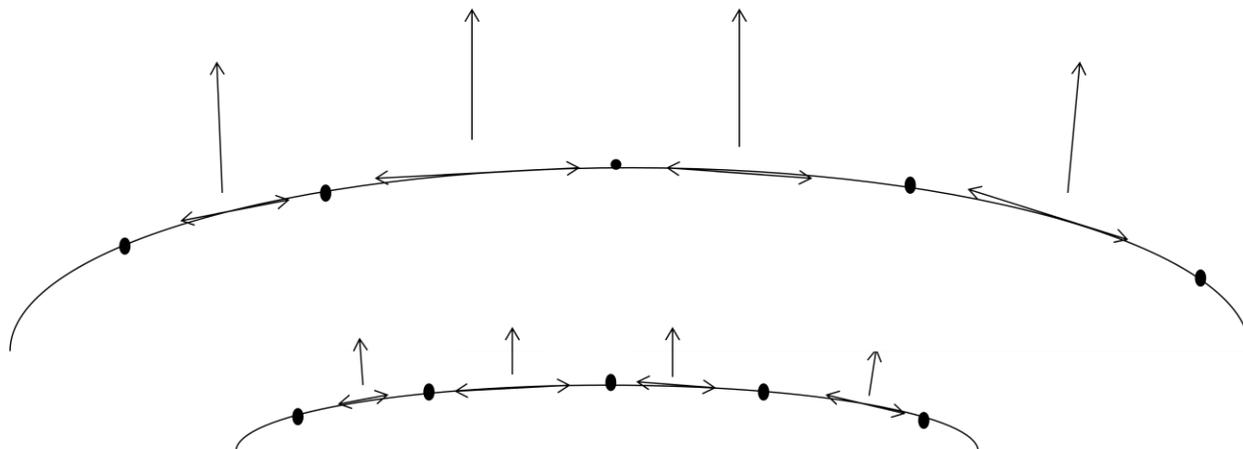
(If we ask atomic physicists, if they "believe" in the phenomenon of inflation, all of them will answer affirmative, but none introduced the effects of this process into the "atomic world")

It is clear that this inflation phenomenon, which influences (and pushes away) massive bodies (outerspace bodies) from Universe, it will influence all elementary particles too. It's not possible that "disturbing" massive bodies, to not influence the elementary particles too.

This phenomenon best explains "fugue" (rejection) of the particles, one from other.

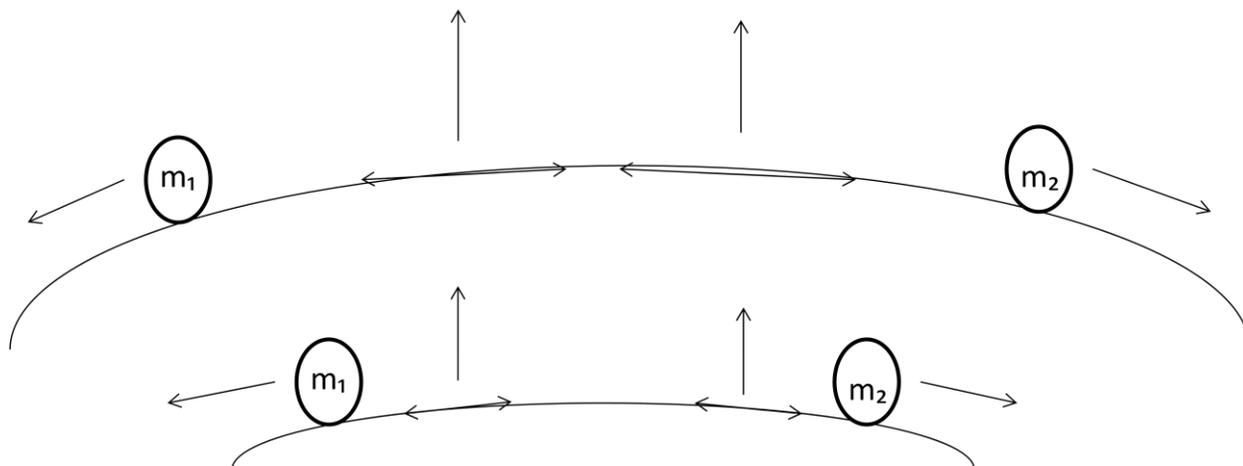
#### **IV. Development of the study:**

Trough inflation we understand „the swelling” of space-time [2][3][4] and it can be imagined like a balloon which has a some dots marked on it, and when it's swelling, the points are push it away, one from other [3], without being actualy „ moved”( to support the action of any forces), as in fig.3.



**Fig 3:** Inflation can be imagined like a balloon that has few points drawn on it, and when it swelling, the points is move away, one from another without that these to be "moved" (without feel the action of some forces) really.  
(Drawing executed by M.A.)

This will also happen with elementary particles. They are not dots on the surface, but will be "pulled" by the space-time which is in the inflation process, as in fig.4, and for an external observer it will seem that they are moving away, one from another, as if it will be under the influence of any field.



**Fig 4:** The elementary particles that are "dragged" of space-time which is in the inflation process , for an external observer it seem that its moving away, one from another, as if under the influence of an physical field.  
(Drawing executed by M.A.)

Now we have the explanation for the phenomenon of fugue (rejection) of the atomic particles, but in this case we can no longer explain the case of attraction between them.

However, one can notice that there is a limit (let say, a critical mass), from where rejection no longer has effect, but prevail only attraction between particles. The mass of the neutron is this „critical mass”, and it is at the limit, between stability and instability.

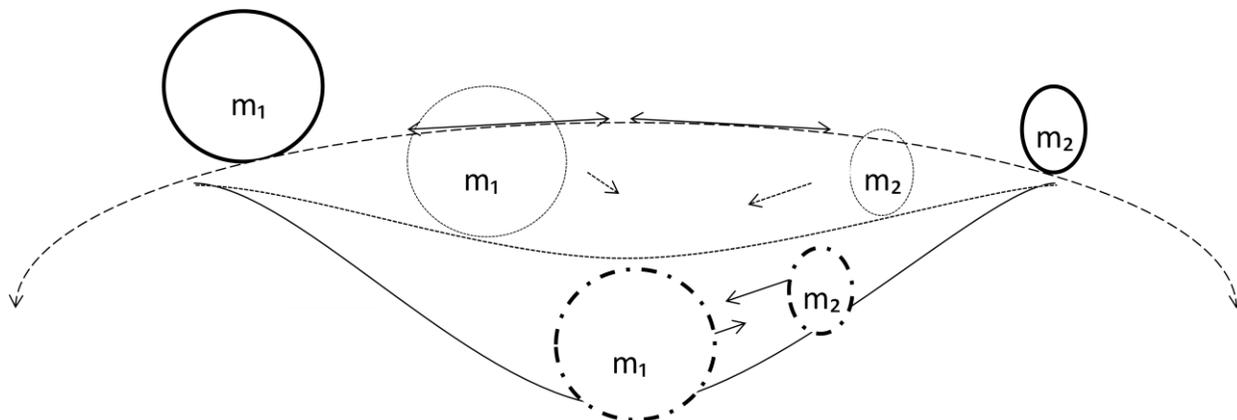
#### **V. Completion of the study:**

From the ideas presented above, we can draw the following conclusions:

- the attraction of particles is the bending of space-time in "downward";
- rejection is constituted by "pulling" the particles by the space-time surface, in the inflation process;
- we have a critical mass, between stability and instability, from where the down-bending process of space-time it may oppose to the inflation process;

Based on these conclusions, we can deduce that when two (or more) masses, which insummed have at least critical mass, are influenced to approaching, „surface tension of the space-time membrane” it will break locally, and it will bend downward. Thus, the bending of the space-time

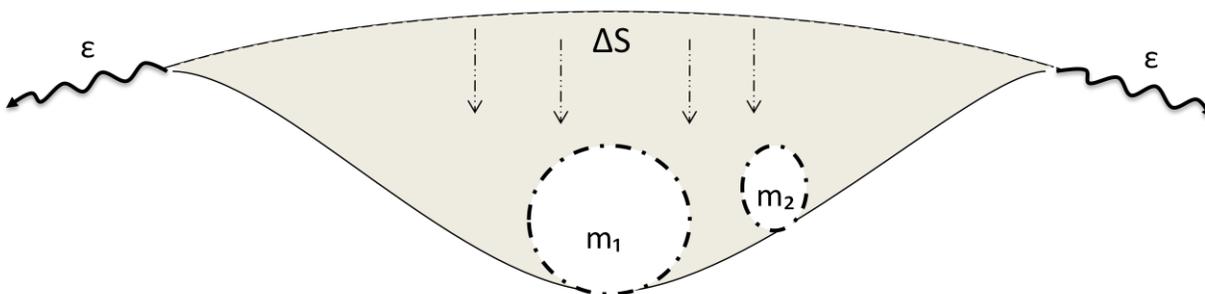
membrane it will keep the masses together (“rolling one to another”), opposing to the pulls of the masses by the surface inflation process, as in fig.5



**Fig.5:** Breaking superficial tension of „space-time membrane”, opposing so to the pulling of the masses by the inflation of the surface process.

(Drawing executed by M.A.)

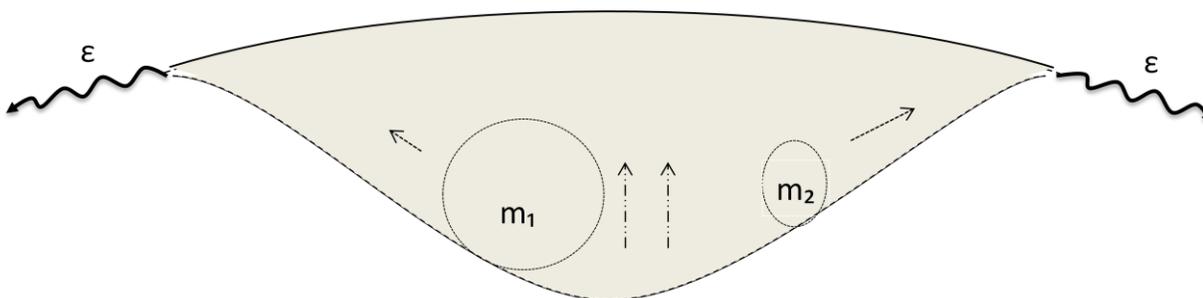
But it is noticeable that when the space-time membrane it's bending, it's doing a mechanical work, transmitting a vibration (an oscillation) „ $\epsilon$ ” to the whole surface, fig. 6. These oscillations behave like a particle [6], generating what we call neutrino.



**Fig.6:** Mechanical work done by the space-time membrane and the transmission of oscillation in the whole surface.

(Drawing executed by M.A.)

But, as I said, this critical mass (obtained from the summation of the masses) is at the limit of stability (in a state of unstable equilibrium) and any small perturbation (under the influence of the inflation process) it will disintegrate into the component parts, and the space-time membrane will once again perform a mechanical work, releasing another neutrino, as in fig. 7.



**Fig.7:** Disintegration of critical mass and the release of another neutrino.  
(Drawing executed by M.A.)

#### **VI. The advantages of this interpretation:**

This interpretation doesn't get in conflict with quantum mechanics and has the following advantages:

- a) shows that everything that we call electrical charge is actually the action of the inflation process on the particles with a lower mass than the critical mass. The inflation process gives the quantitative value of electrical charges;
- b) because the "electrical charge property" is actually a property (a process) of the space-time, the problem of infinite masses and of electrical charges of the electron disappears [5];
- c) neutrinos being a very, very, very small oscillation of space-time (compared with the gravitational waves), it influences very hardly the materia (small energy), making-them very difficult to be detected [1][5][6]. At the same time, being an oscillation whose action can be considered (confuse with) the action of a particle [6], it's easy to understand why it can change from one type to another (metamorphosis of neutrinos), and why it can be mistaken with its own antiparticle;

**Conclusion:**

This material shows that electrical charge is actually a "property" (a process [8]) of space-time, and that its value is given by the inflation of the Universe. Therefore, it means that one of the properties, intrinsic, that were attributed to the elementary particles, belongs in fact to a process of the space-time.

If one of the elementary particles properties belongs to space-time, then, by extrapolation, we might consider that all the properties belongs to it, and that the matter is actually devoid of properties. This makes all constants to "belong" in fact the space-time and explains more easily the "strange" properties of the matter.

At the same time, the critical mass shows the limit between quantum theory and the "classical" (see also the proposal of Roger Penrose, respectively Lajos Diosi)[5] – it shows the limit from which space-time influences the matter, and from where the matter influences the space-time, deforming it.

The theory exposed above is in agreement with the Correspondence Principle.

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