

The Electric Charge

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Abstract

We all know what an electric charge is. We are familiar with thunder and lightning. Caveman must have been familiar with thunder and lightning. Benjamin Franklin experienced the electric charge with his kite. We have seen the giant Van de Graf generators in movies. We know the equations.

The electric charge has been defined by the Standard Model as a fundamental conserved property of certain subatomic particles that determines their electromagnetic interactions. But some people just can't leave it alone. This writer was not satisfied with the standard definition and was looking for the real nature of the electric charge.

In this paper I examine the standard definition in detail. I examine the engineering specifications of the charge; how could we manufacture electric charges. Not being satisfied with the standard definition, in this paper I propose that the electric charge is not electric. The electrical property is a mechanical property. In fact there is no electrical property. We have been fooled. The only elementary particle having this property is the electron. The proton is not a "charged" particle.

Now we have a problem. If this proposal is correct, 200 years of theoretical physics is negated. If this proposal is correct, there are no electric fields and electromagnetic fields. They are just pressure waves propagating from the source. The Standard Model and Relativity Theory all fall apart. It is not my fault. I am just trying to find the truth.

I understand the difficulties to reject the old theory. This idea did not come easy; it took me years to realize what was happening. But if you are an incorrigible believer of fields and magic, there is nothing I can do for you.

The ideas presented in this paper were part of an earlier publication: In Pursuit of Gravitation.

The Electric Charge as You Know It

According to the Standard Model “The electric charge is a fundamental conserved property of certain subatomic particles that determines their electromagnetic interactions. Electrically charged particles are influenced by and create electromagnetic fields. The elementary unit of charge is carried by a single proton and the equivalent negative charge is carried by a single electron”.

This statement tells the student that the electric charge is defined once and for all by its behavior and by its interactions with an electromagnetic field and the student does not need to worry about it any more. The electromagnetic field is also defined by its interaction with electric charges. There isn't an independent definition of neither the electric charge nor the electromagnetic field. The definition of the electric charge by the Standard Model is a description of behavior; it doesn't tell us what an electric charge is. This is not science.

The Standard Model declares: “The elementary unit of charge is carried by a single proton (e^+) and the equivalent negative charge is carried by a single electron (e^-)”. In the Standard Model we also find that there are up quarks with $2/3e$ charge and there are down quarks with $1/3e^-$ charge. Two up quarks and a down quark add up to a charge of $1e$ for a proton. One up quark and two down quarks add up to a charge of zero for a neutron. If the elementary unit of charge is e^+ and e^- , how do we get $2/3e^-$, $1/3e^-$, $1/3e^+$ and $2/3e^+$? Maybe $1/3e$ is the elementary charge?

NAME	Symbol	Charge	Mass
electron	e^-	$-e$	511 keV
positron	e^+	$+e$	511 keV
up quark	u	$+2/3e$	~ 3000 keV
up antiquark	\bar{u}	$-2/3e$	~ 3000 keV
down quark	d	$-1/3e$	~ 6000 keV
down antiquark	\bar{d}	$+1/3e$	~ 6000 keV

It is easy to design these elementary particles on paper. The mathematician can assign a mass and a charge to suit the need without consideration for the creation of these particles. But the particles had to be created and the major problem with the Standard Model is the multitude of elementary particles.

Let us examine the charge to mass ratio of the various elementary particles. The ratios are very dissimilar. If we could take a sharp knife and cut an electron into three pieces, we could use two of the pieces for an up antiquark and use one piece for a down quark. But the newly created up antiquark and down quark wouldn't have nearly enough mass to be a real up antiquark and down quark. That may mean that the charge is not an inherent property of the matter of the electron or the quark. Is the charge somehow painted on or mixed in like colored plaster or confined inside like a cherry seed? Would any of these solutions work?

I have to reject the painted-on charge scenario. We would need two varieties of paint: negative charge paint and positive charge paint. Both varieties would have to come in different densities because of the different sizes of the particles to be painted. The same problem exists with the mixed-in charge. A very large number of mixtures would be required to build the various particles defined by the Standard Model. The only alternative left is placing $1/3e$, $2/3e$ or $3/3e$ charges or their negative counterparts into

the center of the balls created from neutral matter. Any one of these scenarios boggles the mind. Let's move on.

The electric charge is very mystical. The mentioning of electric charge conjures up images of lightning bolts and thunder. Lightning strikes can scorch trees and start fires. Dozens of people are killed every year by charges accumulated in the sky. In science-fiction movies giant Van de Graf generators are used to create monsters. You can build your own static electric generator to make your hair stand up. I remember doing such experiment in high school. In more mundane tasks the electric charge is used as power source by a wide variety of devices. Electric charge in motion is electric current.

The standard definition of charge mentioned at the beginning of this chapter requires that you accept the existence of electric fields and magnetic fields. Let me inject here that an electric charge doesn't exist in empty space; it is always attached to an electron, a proton, or some other particle of mass. According to the Standard Model definition of the charge, an electron uses electric fields to convey to the world that it is a charged particle. My hope is that by now you are questioning these items: What is electric? What makes the electron an electrically charged particle? What is an electric field? How the electron creates an electric field? What is the cause of repulsion between two electric fields created by two electrons?

What is an electric charge at the level of the electron? What makes the electron a charged particle? What means are used by the electron to inform the world that it is a charged particle? The answer depends on your acceptance of the Holy Ghost. According to field theory the electron informs the world by establishing an electric field around itself. This electric field will repulse an electric field created by another electron and attract an electric field created by a positron or proton. This happens in empty space or not so empty space. The magnitude of attractive and repulsive forces is proportional to the magnitude of the charges and follows the inverse square rule for distance between them. We have heard this answer since our high-school days, and now we just nod our heads without hesitation. It is in our blood.

You are reading this paper; you must be an inquisitive person. You want to know what constitutes an electric charge. You also want to know what constitutes an electric field. You really want to know what is there in vacuum or empty space that turns into an electric field by the presence of an electron. What is used by the electron to create this electric field to inform the world around it that it has an electric charge? We are told that this electric field extends to infinity. We are all familiar with equations that describe this electric field, but we're in dire need of working details. If photons are involved what happens to these photons as they move out from the electron? Do these photons return to the electron? Or is there an infinite supply of photons? And what is "electric" about these photons? If electrons emit photons, what is the mechanism for protons? Do they swallow photons?

To believe in an "electric" charge is akin to believe in the Holy Ghost. The acceptance of mysterious electric fields created by distant electric charges is not sound science. There must be energy or pressure information passed by physical contact from the electron to surrounding space. The electron informs the world with physical means that it is a "charged" particle without expanding any energy. I have already discussed the problem of polarity, positive – negative "charges". We need a new model and I am here to provide it.

The Real Electric Charge

In my journey through the darkness I have realized that I must understand the true nature of the electric charge. I must understand the true nature of attraction and repulsion by the electric charge without the use of electric fields. I know fields do not exist. The need for a new model was apparent, but finding it was not easy. The old concept of the electric charge is repeated time and again; it is hammered into my brain and the brain of every student. The equations work. There are no apparent reasons or courage to challenge the concept of the electric charge and the electric field.

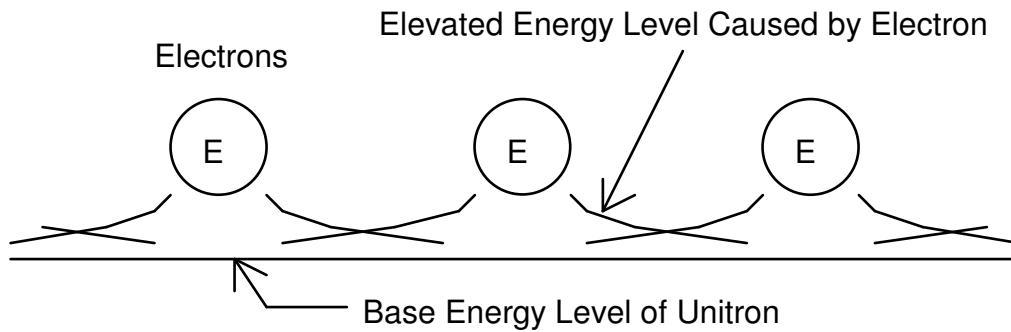
To develop an alternative view of the electric charge required major changes in my thinking. It is not sufficient to massage equations. I had to abandon the cul-de-sac where I found myself and strike out in a new direction. Old concepts of the electric charge and electric fields had to be purged from my brain. There is nothing electric about the electric charge. There is nothing electric about anything. This was a difficult un-learning process.

As I have stated earlier I don't believe in the Holy Ghost and I don't believe in mysterious electric fields created by distant electric charges. There must be energy or pressure information passed by physical contact from the electron to surrounding space. The electron informs the world with physical means that it is a "charged" particle without expanding any energy. I have already discussed polarity, the problem of positive – negative charges.

Let's locate a copper sphere into a vacuum chamber. The copper will insure electron mobility. After injecting a large number of electrons onto the copper sphere, the electrons will distribute themselves evenly over the surface of the sphere because electrons repulse each other. How does this happen? Each electron must inform his electron neighbors that he is an electron and that his neighbor electrons must keep their distance. They behave just like elephant seal beach masters; they keep away from each other. I can tell you electric fields aren't the answer.

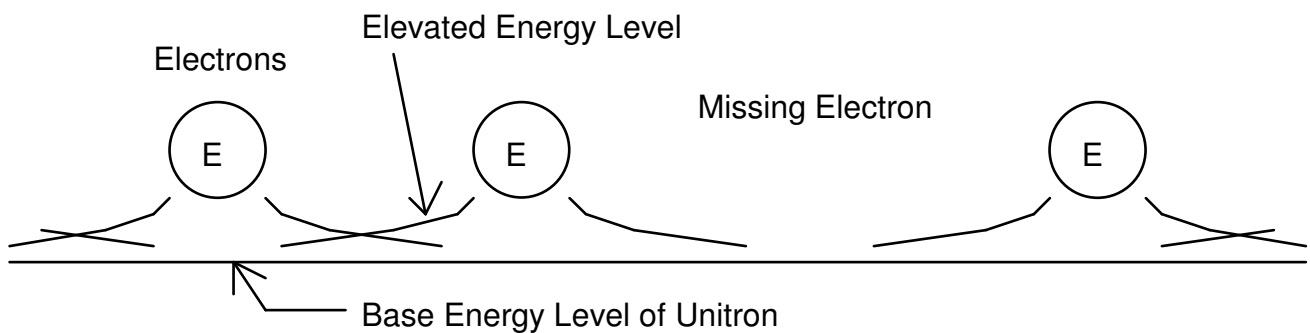
In another paper I have proposed that this Universe is filled with super-gas Unitron at high energy or pressure. It was proposed that this high pressure holds atoms, molecules and crystal structures together. At this point I propose that the electron has a particular surface property that polarizes the random thermal movements of Unitron around the electron. This polarization of thermal movement has the effect of increasing the energy level of Unitron around the electron in the radial direction. The so-called electric charge is a physical property of the electron's surface and not an "electrical" property.

Let's get back to the copper sphere mentioned above. An electron informs the Universe that it is an electron with its surface property by modifying the random thermal movements of the surrounding Unitron. The result of this polarization is a minor elevation of energy level around each electron in the radial direction. This polarization propagates with the speed of light and diminishes with the square of distance. Each electron tries to occupy an area of the lowest energy level; they keep away from the elevated energy levels of each other. Please note that there isn't any expenditure of energy by the electron. Electrons are passive particles, they can't and they don't generate fields.



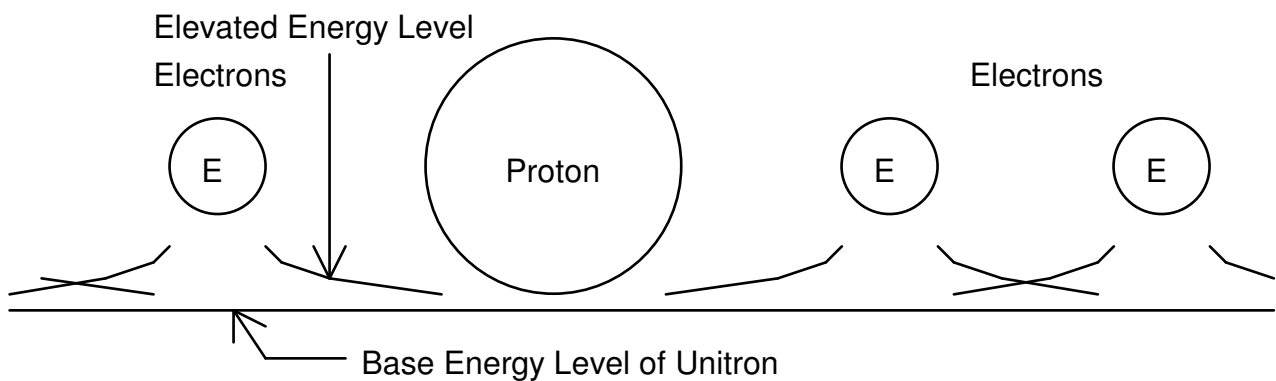
Electrons keep away from elevated energy levels created by other Electrons

Now we have to deal with the subject of polarity. I propose that the only so-called “charged” particle is the electron. Proton has no “charge” at all and a neutron may have half of an electron’s “charge”, but it is neutral to the surrounding space. A neutron maybe a proton with an electron stuck to it. The world can only see half of the electron’s surface resulting in half of the electron’s “charge”. This model doesn’t rely on imaginary fields, action at a distance or Casper.



Missing Electron or “Electron hole” doesn’t “repulse”, it seems to “attract” nearby Electrons

We can create an electron hole by removing a single electron from an evenly distributed group of electrons. This happens in semiconductors. At the site of the electron hole the energy level is not elevated. The electron hole is not repulsing the neighboring electrons, but the neighboring electrons are still repulsed from the opposite sides creating the illusion that the “hole” is pulling the electrons.



A Proton also behaves like a missing Electron, it “attracts” Electrons

A proton also represents an electron hole; it occupies space excluding electrons from that space.

Electrons elevate the pressure of Unitron around themselves, therefore electrons repulse each other. The repulsive nature of electrons keeps the Universe in an “electrically neutral” state. The repulsive nature of these forces makes it difficult to concentrate large numbers of electrons at any single point. It is impossible to create electric forces to rival gravitational forces. It is impossible to suck all the free electrons out of the solar system and pump them into the Sun. If you could achieve this, the electrons wouldn't stay long enough.

To demonstrate the problem, consider the capacitance of a sphere. A sphere of 20 cm radius has a capacitance of 20 picofarads versus the surrounding Universe. The capacitance of Earth is about 710 microfarads. Then we have the equation: $q = I \cdot dt = C \cdot dV$. It is a linear equation. To double the number of electrons on a sphere, the potential to force the electrons onto the sphere must be doubled. The electrons are closer to each other on the sphere, resulting in larger repulsive forces that the outside source must overcome. To store one Coulomb charge on Earth we need to apply 1400 Volts to Earth compared to the surrounding Universe. To store one Coulomb charge on a sphere of 20 cm radius we need to apply $50 \cdot 10^9$ Volts to the sphere compared to the surrounding Universe and Earth. That is 50 billion Volts. And how do you create 50 billion volts? By concentrating one Coulomb charge onto a sphere of 20 cm radius.

My conclusion is that there is nothing “electrical” about an electric charge. The electric charge is the manifestation of a physical property of the electron. It is all about surface property, polarization and the energy contained in Unitron. How can we use tiny electrons to transmit large amounts of power, you ask? How can we do it with polarization of Unitron? Remember the numbers involved. The pressure or energy in Unitron is hundreds of Gigapascals; small polarization can create large forces. The number of electrons in a Coulomb (Ampere-second) is also very large; about 6.2415×10^{18} . While it is difficult to assemble a charge of 1 coulomb on a small sphere, current flow isn't a concentration of electrons; it's a flow of evenly distributed electrons. You can find the number of excess electrons in a section of wire by multiplying the capacitance of the wire section with the potential applied. It is very small

What are electric sparks and lightning? Electrical spark is the violent equalization of electron density between two objects. Violent collisions create photons that we see as lightning or spark.

We come to the question: what is neutral? Neutral is the average energy density of local space and it may vary with the location. In metals there are large number of electrons, the “potential” is higher. Some metals are more “neutral” than others due to the variation in electron density. This difference allows us to make batteries; it also causes corrosion.

The reader may help in the development of this new model. There is a need for creative thinking and sophisticated modeling. It is much beyond the means of this author. It is expected that new and better models will emerge. We must march toward the truth.