

## *In the Philosophy of the Atom: Who Gave the Electron its Negative Charge?*

### *Abstract:*

*Far from mathematical equations, despite their importance, and far from the language of numbers, despite its necessity, this article seeks to answer a question that has troubled its author for many long years: Who gave the electron its negative charge? In that endeavor, the article attempts to grasp the chain of existence from the very beginning of creation. It discusses prime matter, the origin of existence and all existing things. It posits that elements of prime matter coalesced to first form the neutron, and from it, the electron and proton were formed. It discusses the concept of the neutron's energy equilibrium and the upward and downward deviations in energy levels for the electron and proton, respectively. From this, it concludes the origin of the concept of electric charge and the notions of positivity and negativity of that charge. All of this is presented in a narrative with a scientific foundation, albeit one that is distinctly philosophical in its construction.*

*We have learned that objects acquire their charge from the number of electrons they contain. When the number of negatively charged electrons increases relative to the number of positively charged protons in a substance, the substance logically acquires a negative charge. Conversely, if the number of electrons decreases relative to the number of protons, the substance acquires a positive charge.*

*Atoms, for example, become negatively charged if, and only if, they gain one or more electrons in their outer shell. And atoms become positively charged if, and only if, they lose one or more of their outer electrons. Yet the problematic question remains: Who originally gave the electron its negative charge? And consequently, who gave the proton its positive charge?*

*I will not hide from you that this problem has occupied my mind for many years. Every time I think I have arrived at a satisfactory understanding of this dilemma, I find myself back at square one, at the very same problematic question: Who gave the electron its negative charge?*

*Given this persistent difficulty, I considered that the problem might lie in our very concept of the atom, in the scientific model of atomic structure, and in the convention of negative and positive charges and their respective attribution to the electron and proton. Therefore, I decided to trace the beginnings – the origins of each of these concepts and terms. Here is what I have concluded from my unusual reflections.*

### ***The Emergence of the Atom:***

*The atom must have emerged through the prior formation of its constituents, namely protons, neutrons, and electrons. Here I find myself facing four possibilities: First, that all three constituents, or at least two of them, appeared together. Second, that electrons appeared first. Third, that protons appeared first. Fourth, that neutrons appeared first – and this is the possibility I personally favor. Let me explain.*

#### ***First Possibility: The three constituents, or two of them, emerged simultaneously***

*I consider this possibility weak due to the difference in mass among the three atomic constituents. It is inconsistent with the idea of creation from a single origin – prime matter. Nor is it consistent with the second theory of emergence, which states that the universe began with the appearance of matter and antimatter. Adopting the first hypothesis necessitates that the first element to appear must have given rise to one of the other two. The second theory of emergence posits the appearance of two elements of equal mass and opposite charge, which does not match our situation.*

#### ***Second Possibility: Electrons first***

*This possibility might seem realistic because the electron has the smallest mass. However, it requires explaining the source of the electron's negative charge, on the one hand. On the other hand, it requires explaining how a negatively charged element could give rise to a positively charged element (the proton) or a charge-neutral element (the neutron). Although it is theoretically possible to explain this by*

*adopting the theory of emergence based on matter and antimatter, the path to that explanation is very difficult.*

*It could happen that positively charged positrons – the antimatter counterpart of electrons – combine to form protons. It could also happen that an equal number of electrons and positrons combine to form electrically neutral neutrons. Meanwhile, some electrons would remain in their primordial state of mass and charge. Consequently, the three fundamental constituents of the atom would be formed.*

*We would still need to explain why the number of electrons equals the number of protons in the atom, and I find no logical justification for this. Therefore, I consider this possibility weak, despite its strong appeal to proponents of the matter-antimatter hypothesis.*

### ***Third Possibility: Protons first***

*This possibility is obviously invalid. On the emergence scale based on matter and antimatter, the electron appears earlier. On the emergence scale starting from prime matter, the neutron appears first, as we shall see later.*

### ***Fourth Possibility: Neutrons first***

*This is where my intuition leads. Prime matter, the origin of all existing things, coalesced to form the neutron, which, as we know, has no electrical identity. From this neutron, the electron was expelled outward. Thus, the neutron lost part of its mass, and with it, part of its energy. Both the lost mass and energy became the share of the expelled electron. At the very same time, simultaneously, the proton is formed from the neutron that released that electron. Therefore, prime matter coalesced to form the neutron. This neutron lost part of its mass and energy in the form of an electron, and the neutron itself instantly transformed into a proton.*

*According to this model, the neutron's mass is the highest among the three atomic constituents. It is necessarily greater than or equal to the sum of the masses of the proton and electron combined. This is precisely what atomic science confirms: the neutron's mass is greater than the proton's mass by an amount roughly equivalent to about two and a half electron masses.*

*Accordingly, the number of electrons and the number of protons in each atom must be equal. It is also required that the electron's charge be equal in magnitude and opposite in sign to the proton's charge. Both conditions are satisfied; indeed, they are among the scientific constants beyond dispute, though I have some reservations about their implications.*

### ***Important Note:***

*I have not yet used the word "negative" to describe the electron's charge, nor "positive" to describe the proton's charge. Because describing them as such suggests something contrary to reality. More accurately, according to the proposed model, positivity should be attributed to the electron and negativity to the proton. This will be detailed later.*

### ***The Birth of New Concepts:***

*Thus, according to the proposed model, the birth of the electron from the womb of the neutron is the simultaneous announcement of the birth of a wide range of new concepts. The electron, proton, and neutron are entities with different energy levels. The electron has taken a portion of the neutron's energy and manifested it as kinetic energy. The proton, transformed from the neutron that lost that energy, manifests that loss as a state of internal instability and an acquired voraciousness for absorbing energy. And the neutron, which is the basis for the existence of the previous two states, represents the intermediate energy equilibrium between the two deviations.*

### ***The Concept of Energy:***

*It seems that the early legislators struggled to understand the nature of energy in the different atomic constituents, and there are objective reasons for this, of course. The absence of certain knowledge about the true structure of the atom, and the obscurity surrounding the emergence of the atom and its components, allows for such confusion and doubt. Thus, they coined the term "charge" to express the energy of the electron, and they described it conventionally as "negative" to distinguish it from the proton's opposite charge. The existence of two energy values opposite in sign necessitated a distinction, so negativity was assigned to the electron's energy*

*and positivity to the proton's energy by convention. Had they done the opposite, they would have hit upon the very truth.*

### ***The Electron's Negative Charge and the Proton's Positive Charge: The Misleading Implications***

*Again, according to the model under investigation, the electron gains energy, while the proton loses it. Since the term "positive," linguistically, suggests gain and increase, it would have been more appropriate to say that the electron's charge is positive, contrary to current convention. And since "negative" suggests deficiency and loss, it would have been proper to say that the proton's charge is negative, as this would be the truest expression of reality.*

*However, given that convention has gone toward describing the electron's charge as negative and the proton's as positive, and considering the countless explanations and equations built upon that, I will follow the terms that others have adopted, while retaining the specific implications I have previously pointed out.*

### ***The Neutron's Charge:***

*As for the neutron's charge, it is now correct to say that it is neutral, even if only metaphorically. I say metaphorically because the concept of electrical neutrality had no prior reason for existence. It is a secondary concept that followed the emergence of energy deviations from the equilibrium state represented by the neutron. The birth of the electron and proton from the neutron's womb led to the birth of the concepts of negative and positive charge, and consequently to the concept of electrical neutrality as a representation of the intermediate state between them – that is, the state of the neutron's electrical neutrality.*

### ***Important Note:***

*A skeptic might ask about the reason for the mass difference between the neutron and the proton, which exceeds the electron's mass by about two and a half times. According to this model, it should have been equal to only one electron mass and no more.*

*I say: The neutron lost the mass of one electron, and with it, lost a portion of its internal energy as well. Part of this energy was consumed in the act of giving birth*

to the electron, and the other part was acquired by the newborn electron and manifested as kinetic energy. It is known that the loss of internal energy of a substance comes at the expense of its mass. Thus, the parent neutron lost the mass of the child electron, and along with it, lost additional mass that was converted into energy expended in the acts of birth and electronic motion. This provides an explanation for any ambiguity.

### **Conclusion:**

Prime matter existed first, and from it, the neutron emerged from the coalescence of a number of elements of that matter. Then, the electron was born from the womb of the neutron. The electron thus acquired its mass and energy from the parent neutron. As for the parent neutron itself, it became a proton after losing a portion of its mass and internal energy to the newborn electron.

The electron manifests the acquired energy as kinetic energy. The proton manifests its energy loss as a state of internal instability and an acquired tendency and voraciousness to absorb energy to compensate for that loss. The deviation of energy value from the equilibrium line is the basis for the birth of the concept of electric charge, and the difference in direction of this deviation relative to the equilibrium line is the basis for the emergence of the concepts of positivity and negativity.

The model proposed in this research suggests attaching the attribute of positivity to the electron's charge because it signifies gain and increase, and attaching the attribute of negativity to the proton's charge because it is the truest expression of loss and deficiency. This would contradict established convention.

Thus, in the philosophy of the atom, and adopting the model under investigation, electric charge is an expression of the level of internal energy of the atom's constituents. And while respecting, as much as I can, the convention that mistakenly assigns negativity to the electron's electric charge and positivity to the proton's charge, the conventionally negative charge (which is actually positive) is the expression of surplus internal energy of the element – here, the electron. Meanwhile, the conventionally positive charge (which is actually negative) of the proton is the expression of a low level of internal energy of the proton. The concept of electrical

neutrality is an accurate description of the equilibrium state of the neutron's internal energy level, without increase or decrease.

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