A Three-Layered Space Might Explain the Coulomb's Law

Author: Moshe Segal  
moshe.segal@yahoo.com

Abstract

Albert Einstein's General Relativity Theory provided an explanation for Newton's Universal Gravitation Law that defines how two Masses attract each other, by stating that the distortion of Space by Mass causes the gravitational force between masses. However, Coulomb's Law, that defines the attraction/repulsion between two Electric Charges, has an identical structure to the structure of Newton's Universal Gravitation Law. Thus, it is reasonable to wonder, what causes the attraction/repulsion between Electric Charges. This study presents a new model of Space, which suggests an answer to that question. That model describes Space as being composed of three Layers, a Mass Space Layer for masses, a Positive Electric Charge Space Layer for positive electric charges and a Negative Electric Charge Space Layer for negative electric charges. That model also assumes that Masses affect the Mass Space Layer, according to what Albert Einstein's General Relativity Theory claims. In addition, that model describes how Electric Charges affect the additional Space Layers, the two Electric Charges Space Layers, such that the Coulomb's Law is explained, analogous to the explanation of Newton's Universal Gravitation Law by Albert Einstein's General Relativity Theory.


1. Introduction

Newton's Universal Gravitation Law, which defines how Masses attract each other, was presented by the formula: \[ F = G \frac{m_1 \cdot m_2}{r^2} \]
where \( F \) is the gravitational force acting between two objects, \( m_1 \) and \( m_2 \) are the masses of the objects, \( r \) is the distance between the centers of the masses and \( G \) is the Gravitational Constant and is equal to \( 6.674 \times 10^{-11} \text{ m}^3 \cdot \text{kg}^{-1} \cdot \text{s}^{-2} \).

Although Newton's Universal Gravitation Law complied with the experimental results regarding to how two masses attract each other, no explanation why such attraction obeys that formula was provided.

Albert Einstein's General Relativity Theory provided such an explanation. It stated that a Mass distorts the Space/Time entity around that Mass, and that distortion indicates to any other mass how to move, and that movement complied with how such a mass would move if a force \( F \) described by the formula presented above, would be exerted on that mass.
However, Coulomb's Law, which defines how Electric Charges attract or repel each other, has exactly the same structure as Newton's Universal Gravitation Law. Coulomb's Law was presented by the formula: \[ F = \frac{K_e \cdot (q_1 \cdot q_2)}{r^2} \] where \( F \) is the attraction/repulsion force acting between two electric charges, \( q_1 \) and \( q_2 \) are the charge magnitude in each of these electric charges, \( r \) is the distance between the electric charges and \( K_e \) is the Coulomb's Constant and is equal to \( 8.99 \times 10^9 \text{ N} \cdot \text{m}^2 \cdot \text{C}^{-2} \).

Although Coulomb's Law also complied with the experimental results regarding to how two electric charges attract/repel each other, no explanation was also provided to why such attraction/repulsion obeys the formula that was provided in that case.

Since both formulae, Newton's Universal Gravitation Law and Coulomb's Law clearly have identical structures, it is reasonable to ask if there is also an explanation to why Coulomb's Law complies to the above formula which defines it.

This article proposes such an explanation.

It presents a new model of Space. In this model Space contains three layers, a Mass Space Layer for masses, a Positive Electric Charge Space Layer for positive electric charges and a Negative Electric Charge Space Layer for negative electric charges.

That model also assumes that Masses affect the Mass Space Layer, according to what Albert Einstein's General Relativity Theory claims, and Masses are also affected by the Mass Space Layer also as Albert Einstein's General Relativity Theory claims.

In addition, that model describes how Electric Charges affect the two additional Space Layers, the Electric Charges Space Layers, and how Electric Charges are affected by the two Electric Charges Space Layers, such that the Coulomb's Law is explained, analogous to the explanation of Newton's Universal Gravitation Law by Albert Einstein's General Relativity Theory.

\[ \text{2. Space, Masses, Electric Charges and Energy} \]

As stated above, this article presents a new model of Space. In this model Space contains three layers, a Mass Space Layer for masses, a Positive Electric Charge Space Layer for positive electric charges and a Negative Electric Charge Space Layer for negative electric charges.

The first layer mentioned above, the Mass Space Layer for masses, coincides with the Space as it is assumed today, and it is also the same Space entity that is also used to describe how Masses affect the Space/Time entity and how Masses are affected by the Space/Time entity as described in Albert Einstein's General Relativity Theory.

In order to modify the Space entity, and present it as being composed of three layers, this article assumes that Space is not composed of Nothing or Complete Emptiness. This article adopts the assumption that the Space entity itself is a form of Energy. This complies with Albert Einstein's General Relativity Theory requirement to assume that Space is composed of some sort of medium (such as Aether) to provide physical properties to its Space/Time entity.
Einstein's speech in the University of Leiden in May 5th, 1920, explained that his General Relativity Theory require Space to be some sort of medium. [3].

This also makes sense if we assign to Space some sort of fabric, as is visualized in Figures 1 and 2 presented in a following section of this article, in order to enable its distortion.

This also complies with two articles by the author of this article, which present the claim that the universe is composed of only one entity, Energy. The first of these two articles is titled: "Energy Analysis of a Null Electromagnetic Wave" [4]. That article provided the claim that Electric Charges are equated with Energy analogous to Mass being equated with Energy by Albert Einstein's Special Relativity Theory.

The second of these two articles is titled: "Space, Aether and the Dark Energy in the Energy Pairs Theory Framework" [5]. That article provided the claim that Space is not composed out of Nothing or Complete Emptiness and that the Space entity itself is equated with Energy, which also contains untraceable Energy at each point of it, these untraceable energies are stored into a new construct named Energy Pairs.

Thus, if Space is also Energy, it can be assumed that it contains layers, and each layer contains the energies embedded in the entity that it is related to. Thus, the Mass Space Layer embeds the energies embedded in the gravitational field. The Positive Electric Charge Space Layer embeds the traceable energies embedded in the electric and magnetic fields generated by positive electric charges, and half of the untraceable energies embedded in Energy Pairs [4] the half that is untraceable and originated from positive electric charges. And the Negative Electric Charge Space Layer embeds the traceable energies embedded in the electric and magnetic fields generated by negative electric charges, and half of the untraceable energies embedded in Energy Pairs [4] the half that is untraceable and originated from negative electric charges.

This article presents the claim that Electric Charges distort the additional two Electric Charges Space Layers, the Positive Electric Charge Space Layer for positive electric charges and the Negative Electric Charge Space Layer for negative electric charges, as is described in a next section of this article. This article also presents the claim that the movement of Electric Charges is dictated by these additional two Electric Charges Space Layers.

That provides an explanation to the question why Coulomb's Law complies with the formula which defines it, analogous to how Albert Einstein's General Relativity Theory explains why Newton's Universal Gravitation Law complies with the formula which defines it.

3. Explaining attraction/repulsion by assuming Space/Time Distortion.

Figure 1 is a NASA image that is also presented in Space.com site in an article titled: "Einstein's Theory of General Relativity" [6]. That image might be used to provide a visualization of how Albert Einstein's General Relativity Theory uses Space/Time distortion by Mass to explain the attraction between Masses. In that image the Earth Mass creates a Pit in the fabric of Space/Time. That Pit dictates to all other masses how to move, which results in an attraction of all other masses towards Earth.
Figure 2 is the same as Figure 1 only rotated by 180 degrees. That image can provide a visualization of how repulsion can be also explained by *Space/Time* distortion.

If instead of a Pit in the *Space/Time* the Earth *Mass* would create a *Hill* (or a small *Mountain*) in the fabric of the *Space/Time* That *Hill* would dictate to all other masses how to move, which would result in a repulsion of all other masses away from Earth. That distortion in the fabric of *Space/Time* can be also viewed as a mirror image of the distortion of the fabric of *Space/Time* presented in Figure 1.

Fig 1 | visualization of how space distortion can explain attraction. (Image: © NASA)
What actually happens when masses distort the fabric of Space/Time is what is described in Figure 1 and not what is described in Figure 2, but it is presented here only to show how distortion of the fabric of Space/Time can also explain repulsion.

4. A Three-Layered Space Might Explain the Coulomb's Law

As already stated above, this article suggests a new model of Space that is composed of three layers, a Mass Space Layer for masses, a Positive Electric Charge Space Layer for positive electric charges and a Negative Electric Charge Space Layer for negative electric charges.

That model also assumes that Masses affect the Mass Space Layer, according to what Albert Einstein's General Relativity Theory claims, and Masses are also affected by the Mass Space Layer also as Albert Einstein's General Relativity Theory claims. That model also assumes that Electric Charges do not alter (or distort) the Mass Space Layer, and are not affected by the Mass Space Layer, which complies with experience that Masses and Electric Charges do not interact with each other.

On the other hand, this article assumes that Electric Charges alter (or distort) the other two additional Space Layers, the two Electric Charges Space Layers, and are affected by these two Electric Charges Space Layers in the following manner:

Positive Electric Charges distort the Negative Electric Charge Space/Time Layer by creating a Pit in it exactly as a Mass would create a Pit in the Mass Space Layer. And, Positive Electric Charges distort the Positive Electric Charge Space/Time Layer by creating a Hill in it, as visualized by Figure 2 above.
Also, Negative Electric Charges distort the Positive Electric Charge Space/Time Layer by creating a Pit in it exactly as a Mass would create a Pit in the Mass Space Layer. And, Negative Electric Charges distort the Negative Electric Charge Space/Time Layer by creating a Hill in it, as visualized by Figure 2 above.

The fact that Positive Electric Charges distort differently each of the two Electric Charges Space/Time Layers is reasonable, because, as assumed in a previous section of this article, each of these two Electric Charges Space/Time Layers contains different Energy. The same applies to why the Negative Electric Charges distort differently each of the two Electric Charges Space/Time Layers.

Also, the Positive Electric Charge Space/Time Layer dictates to Positive Electric Charges how to move, and the Negative Electric Charge Space/Time Layer dictates to Negative Electric Charges how to move.

Such distortions result in explaining the attraction/repulsion between Electric Charges, as is explained in more details as follows:

A Positive Electric Charge distorts the Negative Electric Charge Space Layer exactly as a Mass distorts the Mass Space Layer, which means that it creates a Pit in the fabric of the Negative Electric Charge Space/Time Layer, as Mass creates a Pit in the fabric of the Mass Space/Time Layer, as Albert Einstein's General Relativity Theory predicts.

Also, this article assumes that Negative Electric Charges are affected by the Negative Electric Charge Space/Time Layer which dictates to the Negative Electric Charges how to move, exactly as the Mass Space/Time Layer dictates to Masses how to move according to Albert Einstein's General Relativity Theory.

Thus, since a Positive Electric Charge generates a Pit in the Negative Electric Charge Space/Time Layer, all the Negative Electric Charges are affected by that distortion in the Negative Electric Charge Space/Time Layer which results in them being attracted to that Positive Electric Charge according to what Coulomb's Law dictates.

Analogous to above also the following occurs:

A Negative Electric Charge distorts the Positive Electric Charge Space Layer exactly as a Mass distorts the Mass Space Layer, which means that it creates a Pit in the fabric of the Positive Electric Charge Space/Time Layer, as Mass creates a Pit in the fabric of the Mass Space/Time Layer, as Albert Einstein's General Relativity Theory predicts.

Also, this article assumes that Positive Electric Charges are affected by the Positive Electric Charge Space/Time Layer which dictates to the Positive Electric Charges how to move, exactly as the Mass Space/Time Layer dictates to Masses how to move according to Albert Einstein's General Relativity Theory.

Thus, since a Negative Electric Charge generates a Pit in the Positive Electric Charge Space/Time Layer, all the Positive Electric Charges are affected by that distortion in the Positive Electric Charge Space/Time Layer which results in them being attracted to that Negative Electric Charge according to what Coulomb's Law dictates.

In addition to the above, this article also assumes the following:
A Positive Electric Charge distorts the Positive Electric Charge Space Layer by creating a Hill in the fabric of the Positive Electric Charge Space/Time Layer.

Also, this article assumes that Positive Electric Charges are affected by the Positive Electric Charge Space/Time Layer which dictates to the Positive Electric Charges how to move.

Thus, since a Positive Electric Charge generates a Hill in the Positive Electric Charge Space/Time Layer, all the Positive Electric Charges are affected by that distortion in the Positive Electric Charge Space/Time Layer which results in them being repelled away from that Positive Electric Charge according to what Coulomb's Law dictates.

And, Analogous to above also the following occurs:

A Negative Electric Charge distorts the Negative Electric Charge Space Layer by creating a Hill in the fabric of the Negative Electric Charge Space/Time Layer.

Also, this article assumes that Negative Electric Charges are affected by the Negative Electric Charge Space/Time Layer which dictates to the Negative Electric Charges how to move.

Thus, since a Negative Electric Charge generates a Hill in the Negative Electric Charge Space/Time Layer, all the Negative Electric Charges are affected by that distortion in the Negative Electric Charge Space/Time Layer which results in them being repelled away from that Negative Electric Charge according to what Coulomb's Law dictates.

Thus, the above provides an explanation to the question what actually causes the attraction/repulsion between Electric Charges as Coulomb's Law defines, analogous to the way Albert Einstein's General Relativity Theory provided an explanation to the question what actually causes the attraction between Masses as Newton's Universal Gravitation Law defines.

6. Summary and Conclusions

This article raises the following question: since Newton's Universal Gravitation Law has identical structure to Coulomb's Law, why the cause of attraction between Masses is explained by Albert Einstein's General Relativity Theory and there is not an analog explanation to the attraction/repulsion between Electric Charges.

This article provides a suggestion for an explanation for that question.

This is done by presenting a new model of Space. That model describes Space as being composed of three Layers, a Mass Space Layer for masses, a Positive Electric Charge Space Layer for positive electric charges and a Negative Electric Charge Space Layer for negative electric charges. That model also assumes that Masses affect the Mass Space Layer, according to what Albert Einstein's General Relativity Theory claims. In addition, that model describes how Electric Charges affect the two Electric Charges Space Layers, such that the Coulomb's Law is explained, analogous to the explanation of Newton's Universal Gravitation Law by Albert Einstein's General Relativity Theory.
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About the author

This article was written by Moshe Segal.

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Moshe has a B.Sc Graduated with distinction (Cum Laude) and a M.Sc in Electronics and Electrical Engineering from the Technion, Haifa, Israel.

Moshe Segal's address is: Ravutzky st. #78 Ra'anana ISRAEL 4322141

Email addresses: moshe_segal@yahoo.com, leasegalster@gmail.com, mirch0@walla.com

Please also note that the article referenced in reference [4] whose title is: "Energy Analysis of a Null Electromagnetic Wave" was also written by Moshe Segal and was also inserted in the open e-Print archive viXra.org.

That article was also published by Physics Tomorrow Letters (PTL) in the Theoretical Physics Journal. The link to that publication is:
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