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

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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 the *Space/Time* entity 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 the *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 the *Gravitation Law* by the *General Relativity Theory*.

Keys: Newton's Universal Gravitation Law, Coulomb's Law, Space, Electric Charges, Energy.

1. Introduction

Newton's Universal Gravitation Law, which defines how *Masses* attract each other, was presented by the formula: [1]

$F = G * (m_1 * m_2) / r^2$ 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 6.674×10^{-11} $m^3 \cdot kg^{-1} \cdot s^{-2}$.

Although the *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, because *Einstein's interwoven Space/Time* is just a form of *acceleration*, and as such it can dictate to any other mass how to move.

(Note: correction on format made by viXra Admin)

However, *Coulomb's Law,* which defines how *Electric Charges* attract or repel each other, has *exactly* the *same structure* as the *Universal Gravitation Law. Coulomb's Law* was presented by the formula: [2]

$F = K_e * (q_1 * q_2) / r^2$ 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 $8.99 \times 10^9 \ N \cdot m^2 \cdot C^{-2}$.

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 an attraction/repulsion obeys the formula that was provided in that case.

Since both formulae, the *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 with 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 the *General Relativity Theory* claims, and Masses are also affected by the *Mass Space Layer* also as the *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 the *Universal Gravitation Law* by the *General Relativity Theory.*

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 the *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 the *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. *Albert 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 the *General Relativity Theory* explains why the *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 the *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.
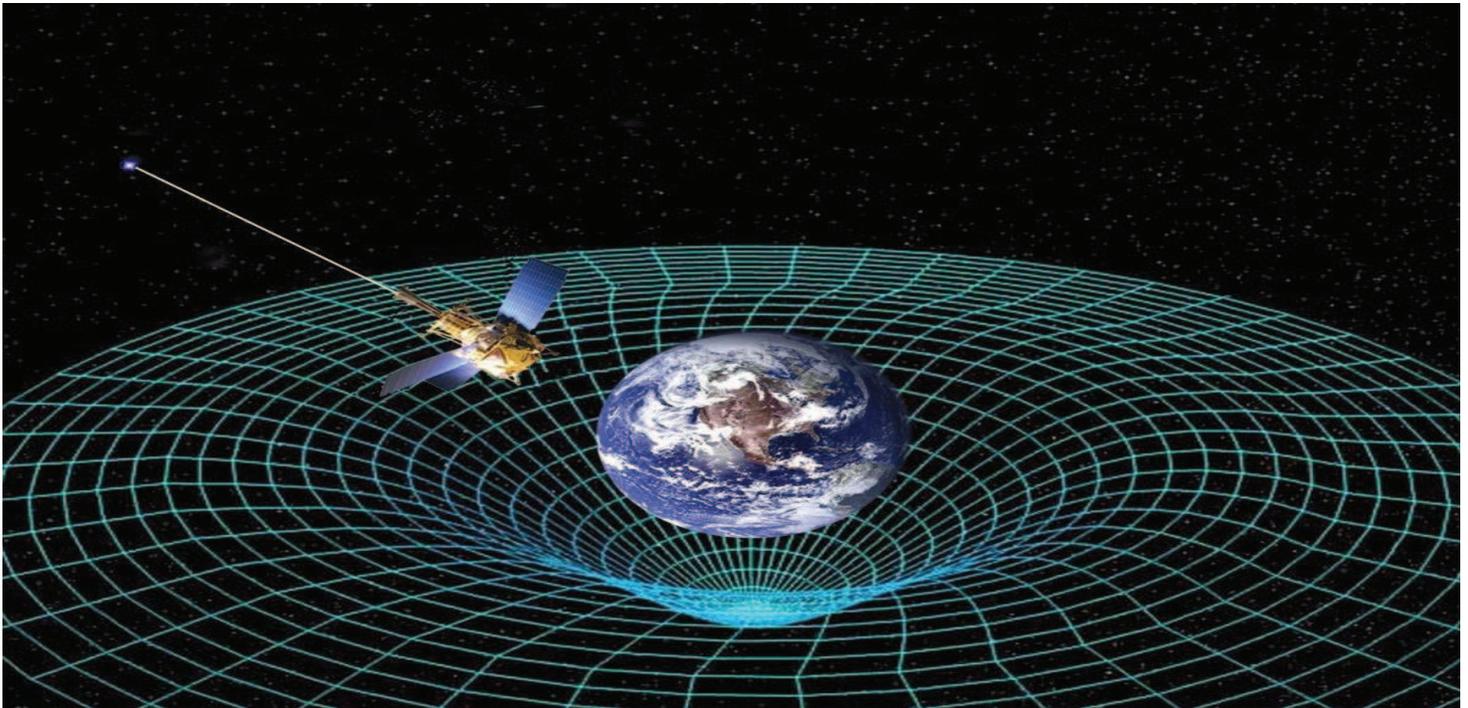

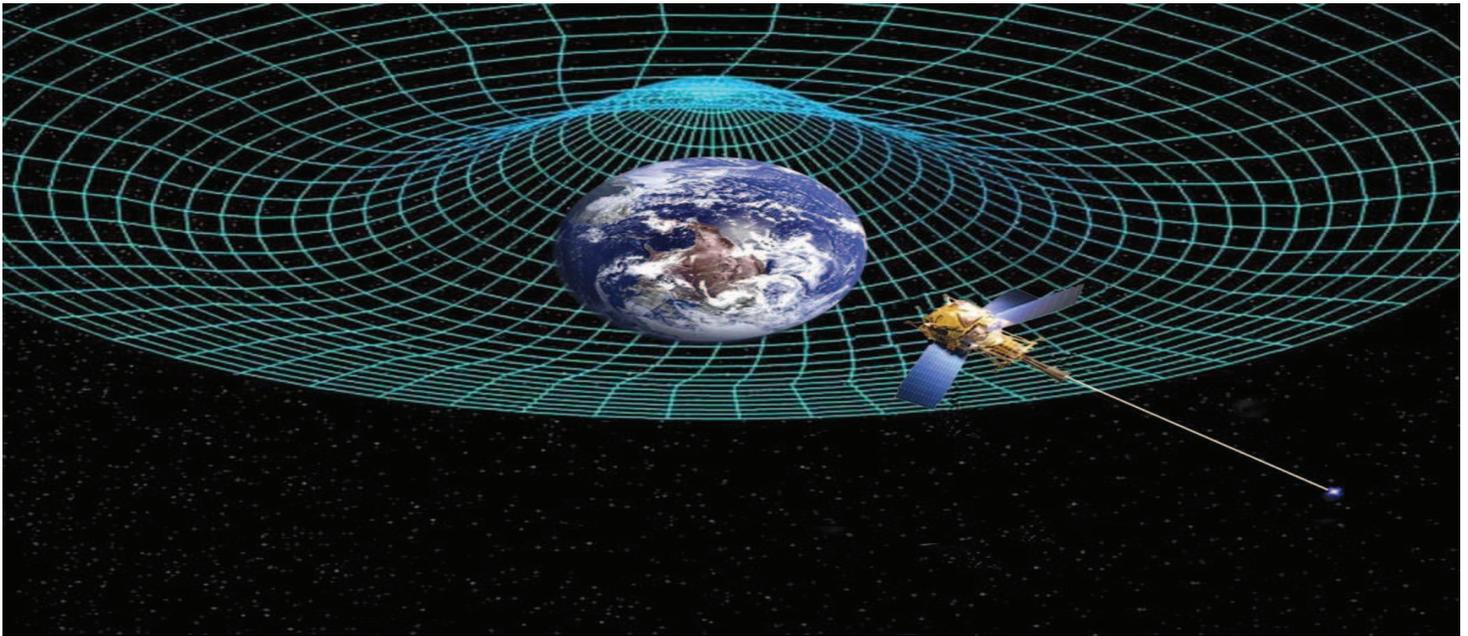Fig 1 | visualization of how space distortion can explain attraction. (Image: © NASA)

Fig 2| visualization of how space distortion can explain repulsion. (Image: rotation of a © NASA image)

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/Time Layer*, according to what the *General Relativity Theory* claims, and Masses are also affected by the *Mass Space/Time Layer* also as the *General Relativity Theory* claims. That model also assumes that *Electric Charges* do not alter (or distort) the *Mass Space/Time Layer*, and are not affected by the *Mass Space/Time Layer*, and also that *Masses* do not alter (or distort) any of the *Electric Charges Space/Time Layers* and *Masses* are not affected by any of the *Electric Charges Space/Time Layers*, 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:

Each *Electric Charge* moves according to what *its Electric Charge Space/Time Layer* dictates. This means that 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.

In addition, each *Electric Charge* distorts *its Electric Space/Time Layer* by creating a *Hill* in it as visualized by Figure 2 above. And, each *Electric Charge* distorts the *Electric Space/Time Layer not* related to its *polarity* (or, related to the polarity of the other type of *Electric Charges*, not its own) by creating a *Pit* in it, exactly as a Mass would create a *Pit* in the *Mass Space Layer*.

This means that whenever a *Pit* is created in an *Electric Charge Space/Time layer*, the *Electric Charges* that are affected by that layer will be attracted to the *Electric Charge* that created that *Pit*. And because that *Pit* is exactly as the *Pit* created by *Masses* in the *Space/Time layer*, that attraction will comply with *Coulomb's Law*, because *Coulomb's Law* has the same *structure* as the *Universal Gravitation Law*.

This also means that whenever a *Hill* is created in an *Electric Charge Space/Time layer*, the *Electric Charges* that are affected by that layer will be repelled away from the *Electric Charge* that created that *Hill*. And because that *Hill* is a mirror image of a *Pit* created by *Masses* in the *Space/Time layer*, that repulsion will comply with *Coulomb's Law*, because *Coulomb's Law* has the same *structure* as the *Universal Gravitation Law*.

The fact that each *Electric Charge* distorts 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*.

This means that *Positive Electric Charges* distort the *Negative Electric Charge Space/Time Layer* by creating a *Pit* in it. And, *Positive Electric Charges* distort the *Positive Electric Charge Space/Time Layer* by creating a *Hill* in it.

Also, *Negative Electric Charges* distort the *Positive Electric Charge Space/Time Layer* by creating a *Pit* in it. And, *Negative Electric Charges* distort the *Negative Electric Charge Space/Time Layer* by creating a *Hill* in it.

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

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 which results in them being attracted to that *Positive Electric Charge* according to what *Coulomb's Law* dictates.

And, 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 which results in them being attracted to that *Negative Electric Charge* according to what *Coulomb's Law* dictates.

Also, 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 which results in them being repelled away from that *Positive Electric Charge* according to what *Coulomb's Law* dictates.

And, 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 which results in them being repelled away from that *Negative Electric Charge* according to what *Coulomb's Law* dictates.

The claim that what was described above explains *fully Coulomb's Law* need some more clarification.

After all *Coulomb's Law* defines a Force F, and there is not any equivalent equation like F = m * a for *Electric Charges*. Also, when the *General Relativity Theory* explains the *Universal Gravitation Law* it does not use the concept of a Force F. There is not real analogy to *Newton's Second Law* (F = m * a) in the *General Relativity Theory*, because the *General Relativity Theory* framework is different from *Newton's Mechanics*. The *General Relativity Theory* uses the distortion of the *Space/Time* to describe how this distortion affects the *motion* of *Masses* because *Einstein's interwoven Space/Time* is just a form of *acceleration*, and as such it can *dictate* to any other mass how to move.

Thus, what this article claims are the following: if the interwoven *Electric Charges Space/Time Layer*s are also just a form of acceleration, as *Einstein's interwoven Space/Time* is just a form of *acceleration*, then, it can also *dictate* to any other charge how to move, and still explain *Coulomb's Law* without the need to involve forces in it.

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

5. 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 the *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 the *Universal Gravitation Law* by the *General Relativity Theory*.

Acknowledgment

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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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