

Consolidating Waves might create the Dark energy

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Abstract

The issue of electromagnetic traveling waves interference was already presented and analyzed extensively. Examples of such scenarios might be counter propagating one dimensional two source waves, or a single source wave propagating in two or more dimensions via scattering one portion of the wave into another portion, such as a double slit experiment with a single source. Analysis of these scenarios show that in these cases, the interference between these waves conserve the wave energy. (Ref 3).

However, the following scenario was not yet presented or analyzed, (according to the best knowledge of the writer of this article) :

A scenario of very focused two source electromagnetic traveling waves, focused such that they can be considered as traveling only in one dimension, which are colliding, and following this collision, the waves consolidate, and continue to travel in the same direction.

It was usually assumed, that two one dimensional waves, moving in the same direction, cannot arrive at the constellation that they collide, then consolidate and continue to move in the same direction. Because if both waves are one dimensional, in order, for the first wave, to collide with another one dimensional wave traveling in its same direction, another wave source must exist somewhere along the line on which the first wave is traveling on. Then, the first wave will collide with this wave source and not with the second wave. However, this scenario can happen.

This article presents a description of how to arrange the above scenario, of two one dimensional waves, originating from two separate sources, which collide, then consolidate and continue to travel in the same direction.

Analysis of this scenario reveals that there might be a loss of the energy that these waves carried before that consolidation, which might be a clear violation of the Energy

Conservation Principle. And if, following this consolidation, the waves have same energy and opposite amplitudes in their electric fields and also in their magnetic fields the waves actually seem to disappear.

In light of the above scenario, and because of the energy loss that might occur when electromagnetic waves consolidate and become unified, and continue to travel together in the same direction, the article argues that such scenarios might be the cause of the Dark Energy, which is a mystery that the science of Physics seeks a solution to it.

Introduction

This article begins with the analysis of two one dimensional electromagnetic traveling waves, originating from two separate sources, which collide, followed by a consolidation of the waves, which continue to travel in the same direction, after this consolidation.

How one dimensional electromagnetic waves, originating from two separate sources can collide, then consolidate, and continue to travel in the same direction, will be explained in a following paragraph, which will also describe how to arrange an experiment that implements this scenario.

But, the analysis of two one dimensional electromagnetic waves which **consolidate and become unified, and continue to travel together in the same direction** shows, that there might be a loss of the energy that these waves carried before that consolidation, which seems as a violation of the Energy Conservation Principle, and the reason for that is as follows:

An electromagnetic traveling wave is a combination of synchronized oscillating electric and magnetic fields, perpendicular to each other, traveling at the speed of light and having energy proportional to its electric and magnetic fields intensities.

And, because electric and magnetic fields are vectors that might annihilate each other if they coexist together in the same space volume and have equal intensities and opposite polarity, then, one can devise scenarios of two such electromagnetic traveling waves that collide and then consolidate such that their electric and magnetic fields annihilate each other **continuously** (completely or even partially) after the collision moment.

In the following chapter of this article, a complete analysis of this scenario will be presented.

In light of the above, the article presents the Energy Pairs Theory that states that electric fields energies or magnetic fields energies, which are dependent on the existence of a force field (electric or magnetic) in order to exist, can annihilate each other, in certain situations, an annihilation that seems to violate the Energy Conservation Principle. And thus, these energies

are assigned as pairs of Energy Pairs. And, the above described scenario is presented as a proof of this Energy Pairs Theory.

Then, the following argument is presented: mutual annihilation of energies, or energy loss of energies embedded in any Energy Pair, can be viewed not as mutual annihilation or energy loss, but as mutual disabling, assuming that the energies exist as Energy Pairs, and their mutual disabling is only seen as annihilation or energy loss.

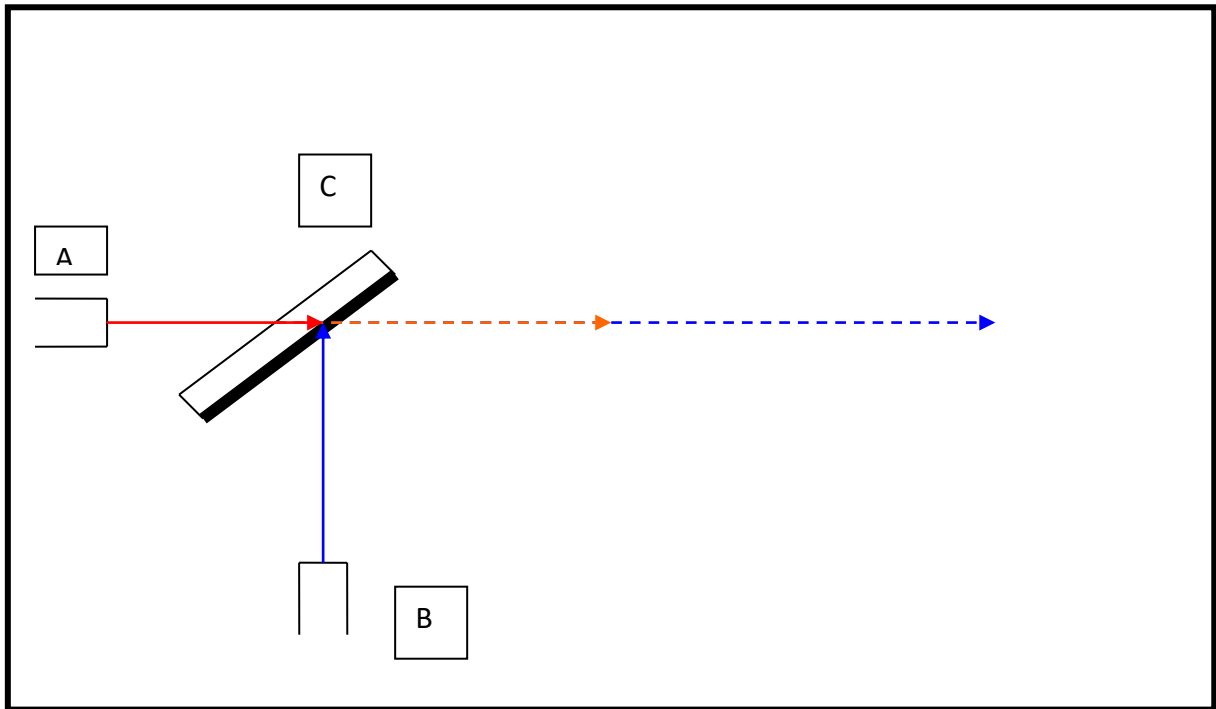
Thus, if the energies do exist, an extrapolation of this assumption can state, that Energy Pairs can evolve together again, from, what is viewed as nothing, or complete emptiness.

Then, by combining the following: the findings about energy loss of electromagnetic waves which consolidate and become unified and continue to travel together in the same direction, and the assumption that such lost energies can evolve together again from complete emptiness, it can be concluded that electromagnetic waves which consolidate and become unified, and continue to travel together in the same direction, might be seen as a source of the Dark Energy, which is a mystery that the science of physics seeks a solution to it.

Description of an experiment demonstrating the described scenario

The above described scenario of two one dimensional electromagnetic waves which consolidate and become unified, and continue to travel together in the same direction can be converted to a physical experiment which can be arranged as shown by Fig. 1 below:

Fig 1



An electromagnetic wave source A generates the very focused first (red) one dimensional electromagnetic traveling wave , which passes through the half transparent mirror C, and is supposed to continue, after it passes the half transparent mirror C (as the dotted red line indicates).

A second electromagnetic wave source B generates the very focused second (blue) one dimensional electromagnetic traveling wave, that is deflected by the mirror C, such that it is supposed to continue on exactly the same line as the first wave (as the dotted blue line indicates).

It might be difficult, technologically, to arrange such an experiment, because the

requirement is that the blue wave will arrive at the half transparent mirror C such that it will be deflected in exactly the right angle, in order to consolidate completely with the red light wave. And, because the waves are supposed to be very focused and, actually, almost one dimensional, this might be a difficult task to achieve. But, in principle, such a constellation will create the above described scenario of two one dimensional electromagnetic waves which consolidate and become unified, and continue to travel together in the same direction. And, the issue if energy is indeed lost in this experiment, can be examined.

Another issue might be the question of what happens with the photons, which are the particle manifestation of these electromagnetic traveling wave. Do they also disappear when the electric and magnetic fields annihilate each other continuously? If an experiment will be conducted, this might answer this issue. This issue is also further examined in a following section of this article.

Actually, this experiment might provide, in any case, significant insights regarding or related to electric charges and electric and magnetic fields and energies.

On one hand, it might reveal that the waves and their energies do disappear, in the above described scenario, which, if this will be really the findings of this experiment, it will be a **very significant finding**.

Alternatively, if the Energy Conservation Principle will be found not to be violated, since the fields seem be annihilated, when the waves do consolidate in a specific constellation, the experiment might provide another very significant finding. Namely, that the energy of electric or magnetic fields does not depend on the existence of the fields, and thus, might not be embedded in the these fields. **Another significant finding**, which might raise, the question, on what, then, the energy of electromagnetic waves depend, and where it is embedded in the waves.

Finally, even if the Energy Conservation Principle will seem to be violated, an alternative assumption might be that the waves energies exist and both waves energies only disable each other, which might be a lead to the origin of the Dark Energy, a mystery that the science of Physics seeks a solution to it.

All that will be elaborated more in the next section of this article.

Analysis of Energy loss in consolidating waves

An analysis of two one dimensional electromagnetic waves which consolidate and become unified, and continue to travel together in the same direction, will now be presented.

How to arrange an experiment that implements the above scenario was already described in the previous section of this article.

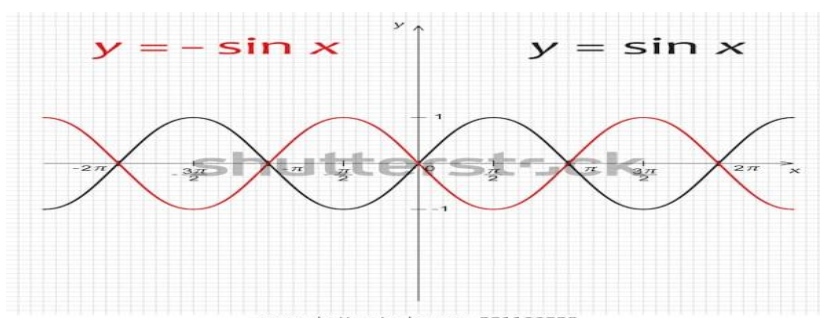
Fig. 2 below shows, for example, the electric fields intensities of two **consolidated** oscillating waves at a specific instance of time, say $t=0$. The y-axis represents the amplitude of each of the electric fields at this moment of $t=0$, at any location of the wave traveling line, which is represented by the x-axis. If both waves travel along the line represented by the x-axis at the **same speed**, then, at any following moment t in their wave journey, a picture representing these electric fields **relative** to one another **will be the same as Fig. 2**, only **shifted along the x-axis** by a **displacement** equal to the velocity of the waves multiplied by the new time instance t .

If the oscillation of the electric fields or the magnetic fields of the two waves, after the consolidation, will look like the waves presented in Fig. 2 below, they will clearly annihilate each other.

Because, if the red wave in Fig. 2 represents, for instance, the electric field oscillation of one wave, and the black wave in Fig. 2 represents, the electric field oscillation of the second wave, the electric fields of both waves will annihilate each other, continuously.

And, if the oscillating magnetic fields of both waves are also represented by Fig. 2, (but y-axis replaced by z-axis, because the electric and magnetic fields are perpendicular to each other) also the magnetic fields of both waves will annihilate each other, continuously.

Fig. 2



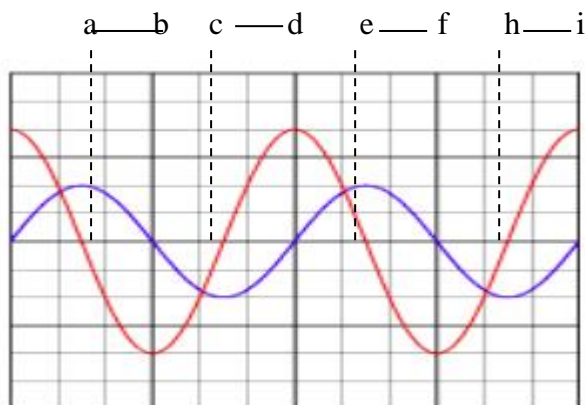
So, both waves will disappear after their consolidation. And because the energies of both waves exist only when their electric and magnetic fields exist, their energy will also disappear after this consolidation. A clear violation of the Energy Conservation Principle.

However, in a scenario were two waves **consolidate and become unified, and continue to travel together in the same direction**, even if they have **any phase shift relative to one another**, or have **different frequency of oscillation**, some of the energy they initially contained will usually seem to disappear.

Because, if Fig. 3, for example, represents the oscillation of the electric fields of the two waves at an instant of time, say $t=0$, because these oscillations have a phase shift relative to one another, there are portions, such as a-b, c-d, e-f and h-i, in each oscillating cycle, where one wave have opposite polarity relative to the other wave.

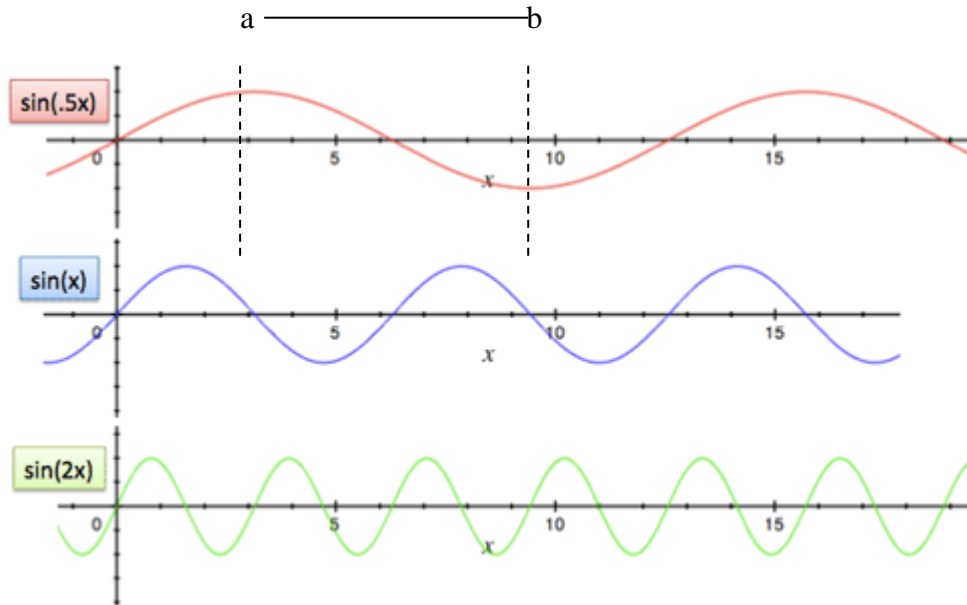
And, in these portions of the oscillating cycle, portions of one wave will annihilate these portions in the other wave, which will result in reducing the electric field intensity in these portions in the oscillation cycle. Which results in an energy loss. And this energy loss will occur continuously, because Fig. 3 represents the waves along all their journey, following their consolidation, because they travel at the same speed along the one dimensional x-axis.

Fig. 3



A similar argument apply to the case of waves which oscillate with different frequencies.

Fig. 4 below shows 3 such waves:



If the first two waves in Fig. 4 ($\sin(.5x)$ and $\sin(x)$), for example, represents the oscillation of the electric fields of the two waves at an instant of time, say $t=0$, because these oscillations oscillate at different frequencies, there are portions, such as a-b, in each oscillating cycle of the wave $\sin(.5x)$, where one wave have opposite polarity relative to the other wave, which results in an energy loss. And this energy loss will occur continuously, because Fig. 4 represents the waves along all their journey, following their consolidation, because they travel at the same speed along the one dimensional x-axis.

So, for waves that **consolidate and become unified, and continue to travel together in the same direction** the Energy Conservation Principle seems to be violated **almost always, and almost in any constellation.**

The Energy Pairs Theory

From the above described scenario, in which, the Energy Conservation Principle seem to be violated, the article derives the Energy Pairs Theory, which states, that electric fields energies or magnetic fields energies, which are dependent on the existence of a force field (electric or magnetic) in order to exist, can annihilate each other, in certain situations, an annihilation that seems to violate the Energy Conservation Principle. And thus, the article assigns such energies to pairs of Energy Pairs.

In light of the above described scenario, this article assigns the energy embedded in electric fields generated by positive charges, and energy embedded in electric fields generated by negative charges to one set of energy pairs. And, this article also assigns the energy embedded in magnetic fields generated by moving positive charges, and energy embedded in magnetic fields generated by moving negative charges to another set of energy pairs.

And, the above described scenario is presented as a proof of this Energy Pairs Theory.

However, the mutual annihilation of energies belonging to these waves can be viewed not as mutual annihilation but as mutual disabling, assuming that the energies **exist** as Energy Pairs and their mutual disabling is only seen as annihilation. This possibility will be discussed more in the following section.

More on consolidating waves and Dark Energy

The energy loss in the scenario of electromagnetic waves which **consolidate and become unified, and continue to travel together in the same direction**, that was described above can be explained in several ways.

the first possible explanation might be that the energy is indeed lost and the Energy Conservation Principle is indeed violated in this scenario. Because, if the electric and magnetic fields of the waves are annihilated, or reduced in their intensities, then, since the energy embedded in the waves is known to be manifested in these fields, then, the energy is indeed lost.

Actually, the question if the fields are indeed annihilated can be verified by the experiment which was proposed for implementing this scenario. Since these fields must affect charges that exist in these fields, the experiment can be conducted such that charges will exist on the traveling line of the consolidated waves.

If the experiment will be conducted such that these charges will exist when the waves are supposed to be annihilated, then, if the charges will not be affected, it will be a proof that the fields are indeed annihilated.

If the charges will be affected, then the conclusion that the Energy Conservation Principle is violated must be dropped. But, there will still be an unresolved issue, how the charges are affected when the fields are supposed to be annihilated. One explanation to that might be, that the photons still exist.

If the experiment will show that the charges are not affected, and thus, the fields are indeed annihilated, then, another explanation can be provided, to what might still seem, as indeed, a violation of the Energy Conservation Principle:

The mutual annihilation of energies belonging to these waves can be viewed not as mutual annihilation but as mutual disabling, assuming that the energies **exist** as Energy Pairs and their mutual disabling is only seen as annihilation.

An analogy to the above might be the description of what happens to the energy in a rope in a

rope pulling game. When two people pull a rope, each in a direction opposite to the other, if their pulling force is exactly equal, the rope does not move. However, this does not mean that the pulling energies that are exerted on the rope really annihilate each other or disappear. These energies are accumulated or amassed in the rope tension.

The same should occur when two electric fields forces (or magnetic fields forces) of exactly the same intensity and equal polarity annihilate each other. The energies of these electric (or magnetic) fields are not annihilated or disappear, they are accumulated or amassed in the location in space where they reside, but they cannot express themselves. They only disable each other.

Thus, if the energies do exist, an extrapolation of this assumption can state, that Energy Pairs, or the annihilated waves, can evolve together again, from, what is viewed as nothing, or complete emptiness.

Now, some aspects of the question of how the annihilated waves can appear again, can also be examined, by the above proposed experiment.

Even if the fields are found to be annihilated when the waves are supposed to be consolidated, if a detector (of any sort), that will be devised for that purpose, will be inserted on the waves traveling line, and this detector will detect something, then, again, the explanation that the Energy Conservation Principle was violated, must be dropped. However, in this case, again, there will still remain the issue, how that happened, when the fields were indeed annihilated, because the waves did not affected the charges that existed on the waves traveling line. Again, an explanation to that might be, that the photons still exist.

However, in all the cases which will prove that although the fields seem to be annihilated, but the Energy Conservation Principle will found to still be not violated, the experiment will provide a new understanding, that the energy embedded in electromagnetic waves is not manifested in their electric and magnetic fields, but in something else, maybe in the photons they carry, and this by itself might be a very significant finding.

However, if such a devised detector, inserted in the waves travel line will not detect anything, still the assumption that the energies exit but disable each other might be considered a viable

explanation to this whole scenario. But, then, the issue how they might be created again together, will remain an open question, because then, the waves seem to be untraceable.

Then, by combining the following: the findings about energy loss of electromagnetic waves which consolidate and become unified and continue to travel together in the same direction, and the assumption that such lost energies can evolve together again from complete emptiness, it can be concluded that electromagnetic waves which consolidate and become unified, and continue to travel together in the same direction, can be seen as a possible source of the Dark Energy which might be also seen as the complete emptiness.

Because, the assumption that the complete emptiness actually contains energy pairs that disable each other, makes it containing energies that are untraceable, as the Dark Energy is. And, the assumption that energy pairs can emerge together from nothing (or complete emptiness) might explain how this Dark Energy is able to enter into activity, in certain conditions.

If the above scenario occurs in outer space, such that the two waves consolidate and become unified, and continue to travel together in the same direction, for a very long journey together, and possibly even a very long time (although they travel at the speed of light), throughout this all long journey, and this all long time, the waves, and their energy cannot be traced. And, even if we assume that after this long journey the waves, for some reason, become separated again, and they, and their energies become traceable, it will seem as waves and energy are generated out of complete emptiness.

It was also shown before that in the case of electromagnetic waves that consolidate and become unified, and continue to travel together in the same direction, the Energy Conservation Principle seems to be violated **almost always, and almost in any constellation.**

Thus, since a huge portion of the energy in the universe is composed of electromagnetic waves, and these waves might be banded and deflected, the probability that such scenarios occur in the whole universe is big, increasing significantly the possibility that this might **provide an explanation to the issue of Dark Energy**, which is a mystery that the science of physics seeks an explanation to it. Actually, the above described scenario can be also seen as equating the Complete Emptiness with this Dark Energy state.

Summary, Results and Conclusions

This article presents a scenario, of a collision, followed by a consolidation, between two one dimensional electromagnetic waves, which continue to travel together in the same direction, after that consolidation.

The article shows that in the above described scenario there might be energy loss and even complete annihilation of both waves.

The article shows how to arrange an experiment to demonstrate the above described scenario.

This presented scenario, and this experiment, can show that electromagnetic waves that consolidate and become unified, and continue to travel together in the same direction, might be a possible source of the Dark Energy.

Actually, the above described scenario can be also seen as equating the Complete Emptiness with this Dark Energy state.

In several articles, such as: "Electric Charges as Energy Pairs" that can be found at <http://viXra.org/abs/1909.0098> and "Energy Pairs might turn to Dark Energy" that can be found at <http://viXra.org/abs/1909.0149> some of the issues presented in this article such as the Energy Pairs Theory is also presented, with more details.

Also additional implications that might be concluded from the above described scenario are also presented in those additional articles, such as the claim that charge might also be some sort of energy, as the mass was recognized as being a sort of energy, after the presentation of the Special Relativity Theory.

References

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