A discussion about Humans ability to evaluate exactly Energy amounts and whether this might have possible implications on the Energy Conservation Principle

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Abstract:

A corner stone of Physics is the Energy Conservation principle which states that the Energy is always conserved and that the Energy, embedded in the whole Universe, cannot disappear or be created from nothing.

This should imply that the Total amount of the Energy, which is embedded in the whole Universe, must be a ***constant value***.

However, Humans ***are not able*** to devise means or experiments which will provide the exact amount of the Energy embedded in the ***whole Universe***, which implies that Humans ***are not able*** to devise means or experiments which will conclude, ***with complete validity***, that the amount of the Energy embedded in the whole Universe, can be ***indeed*** represented by a ***constant value***.

Moreover, the fact, that the nowadays Science of Physics does agree that in addition to the Detectable Energy, the Universe embeds a very large amount of undetectable, or Dark Energy, (about 70% of the estimated Total Energy which is estimated to be embedded in the whole Universe is estimated to be Dark Energy), might further imply, that Humans cannot evaluate the actual amount of the Total Energy embedded in the Universe, which might further support the assumption, that Humans cannot prove, that all the Energy embedded in the Universe, is indeed conserved.

The above implies that Humans ***are not able*** to provide a ***proof*** for the Energy Conservation Principle, which means, that the Energy Conservation Principle is presented only as an ***axiom***, and no discussion was yet provided as to the extent of ***validity*** that Humans can attribute to the Energy Conservation Principle, even though, it is a corner stone of the nowadays Science of Physics.

Thus, in view of the above, this paper tries to examine the extent of the ***validity*** that Humans can attribute, to the Energy Conservation Principle.

Initially, this paper tries to explore, if the evaluation of the amount of Energy, ***only*** in certain specific Energy components, in the Universe, will result in the evaluations of the ***same*** Energy amounts, by all Human evaluators, ***or***, if separate Human evaluators might arrive at ***different results***, relating to the Total Energy Content, of these certain several specific Energy components, which they evaluated.

Thus, in view of the above, this paper provides ***arguments*** that two separate Humans, evaluating the Total Energy Content of certain several specific Energy components, in the Universe, ***might arrive*** at ***different results***, relating to this Total Energy Content, of these several specific Energy components, which they evaluated.

The arguments mentioned above, relating to the possibility that two separate Humans, evaluating the Total Energy Content of certain several specific Energy components, in the Universe, ***might arrive*** at ***different results***, relating to this Total Energy Content, of these several specific Energy components, which they evaluated, appear also in an additional paper, by the author of this paper, titled: "A discussion related to the Energy Relativity and its Implications" (4).

However, in order to emphasize the possibility, that evaluations of Energy amounts by Humans ***might be*** also relative, to the Human which executed that evaluation of this Energy amount, the additional paper, mentioned above, ***did not*** elaborated on the ***limitations***, that ***also exist***, in the arguments that two separate Humans, evaluating the Total Energy Content of certain several specific Energy components, in the Universe, ***might arrive*** at ***different results***, relating to this Total Energy Content, of these several specific Energy components, which they evaluated.

Thus, this paper presents also these ***limitations*** which ***further emphasizes*** the conclusion, presented also in the additional paper, mentioned above, that, although Energy evaluations by Humans ***might be sometimes relative*** to the specific Human evaluating that Energy, ***The Energy Conservation Principle should be recognized as a valid principle*** when it relates to Energy conservation related to what Humans detect in ***any specific Inertial Frame of Reference***.

And, although Humans cannot provide a complete proof for the Energy Conservation Principle, as related to the ***whole Universe***, Humans should still attribute validity to the Energy Conservation Principle, also as related to the ***whole Universe***, because it is a very significant corner stone of the nowadays Science of Physics, but should recognized that this validity is attributed to this principle only ***as an axiom***, without being able to prove it.

An important factor, in the arguments, presented in this paper, and the additional paper mentioned above, relating to the possibility that two separate Humans, evaluating the Total Energy Content of certain several specific Energy components, in the Universe, ***might arrive*** at ***different results***, relating to this Total Energy Content, of these several specific Energy components, which they evaluated, is the following:

The nowadays Science of Physics recognizes only one velocity as absolute, non-relative velocity. This velocity is the velocity of Light in vacuum, which is also recognized as the maximum velocity that Humans can attribute to a moving body.

All other velocities are recognized, by the nowadays Science of Physics, as non-absolute or as relative velocities, and this implies, as this paper presents, that Humans might be in situations, in

which, their evaluations of the Kinetic Energies, which should be attributed to moving bodies, ***might turn to be wrong evaluations***.

The paper then elaborates on the ***Implications*** of what was presented above, on the Energy Conservation Principle.

1. Arguments that the Energy evaluations by Humans might be sometimes relative to the Human which evaluated that Energy.

A corner stone of Physics is the Energy Conservation principle which states that any amount of the Energy which is embedded in the whole Universe, cannot disappear or be created from nothing.

This should imply that the Total amount of the Energy, embedded in the whole Universe, must be a constant value, because no amount of Energy, in the Universe, can disappear or be created from nothing.

Because, as already stated above, the Total amount of the Energy, which is embedded in the whole Universe, must be constant, according to the Energy Conservation Principle, all Humans should arrive at the same value of the Total amount of the Energy which is embedded in the whole Universe.

However, Humans cannot devise means or experiments which end up in providing an exact value of the Total amount of the Energy which is embedded in the whole Universe.

Thus, it seems that Humans did not provide yet a complete validity, or a complete proof, to the Energy Conservation Principle, and no discussion was yet provided as to the extent of ***validity*** that Humans can attribute to the Energy Conservation Principle, despite the fact that this principle is considered to be a very significant corner stone of the nowadays Science of Physics.

Thus, this paper tries to elaborate on this very issue.

This paper states, that in addition to the fact that Humans ***cannot*** arrive at an exact value of the Total amount of the Energy which is embedded in the whole Universe, different and separate Humans might also arrive sometimes at ***different values*** for the amounts of Energy embedded in the ***same*** several Energy components in the Universe, which implies that at least ***some*** of these Humans might arrive at ***wrong results*** as related to these evaluations, of these ***same*** several Energy components in the Universe, and that Humans evaluations of the amounts of Energy might be sometimes ***relative*** to the Human who executed these evaluations.

Moreover, the nowadays Science of Physics recognizes only one velocity as absolute, non-relative velocity. This velocity is the velocity of Light in vacuum, which is also recognized as the maximum velocity that Humans can attribute to a moving body.

All other velocities are recognized, by the nowadays Science of Physics, as non-absolute or as relative velocities, and this implies, as this paper presents, that all Humans are sometimes bound

to be in situations, in which, their evaluations of the Kinetic Energies, which should be attributed to all moving bodies, might turn to be wrong evaluations.

This paper also provides ***arguments*** that Humans that evaluate the amount of Energy in specific Energy components, and then experience a change of velocity (Acceleration), and following this Acceleration end up in an Inertial Frame of Reference which is moving at a ***different velocity***, as compared to the velocity that existed in the Inertial Frame of Reference, in which these Humans resided, before they experienced the above mentioned Acceleration, might ***change their evaluations***, as related to the amount of Energy embedded in the ***same*** above mentioned Energy components, and might ***not detect changes*** in the Energies that should be attributed to the ***same*** above mentioned Energy components.

From the above, this paper presents ***arguments*** which imply that ***Humans*** might be sometimes bound to be in situations in which they will evaluate ***wrongfully*** the ***Kinetic Energies*** attributed to massive bodies in the Universe, and this is presented, in details, in the following:

Einstein's Special Relativity Theory brought about the recognition that the Mass is equated with Energy via his famous equation (*1*):

$E= mc^2$.

Where E is Energy, m is the amount of Mass and c is the velocity of Light in vacuum.

Einstein's Special Relativity Theory also brought about the recognition that a Human evaluating the amount of Mass in a specific Massive body which is moving at a constant velocity, v, relative to this Human, sees an increase of the amount of Mass in this Massive body, relative to the amount of Mass evaluated in this Massive body, by this Human, when this Massive body is at rest, relative to this Human, according to the following equation (*2*):

$m = m_0 / \sqrt{(1-v^2/c^2)}.$

Where m is the evaluated amount of Mass, by the Human, in the moving massive body, m_0 is the evaluated amount of Mass, by the Human, when the massive body is at rest relative to the Human, v is the velocity of the massive body relative to the Human, and c is the velocity of Light in vacuum.

It should be also stated, that the increase in the evaluation of the amount of Mass, that any Human detects in a Mass which is moving relative to this Human, as presented in Einstein's Special Relativity Theory, and was also presented above, is attributed to the ***Kinetic Energy*** that this Human detects relating to this moving Mass, which implies, that any Human will ***indeed*** detect an ***additional Energy*** embedded in any moving Mass, the ***Kinetic Energy*** attributed to that moving Mass.

Thus, let's examine how two Humans evaluate the Total amount of Energy in two specific massive bodies, when each Human resides in a ***separate*** Inertial Frame of Reference, and the ***relative velocity*** between these two Inertial Frames of Reference is v.

In these evaluations each Human evaluates the amount of Mass, m_1, in a specific massive body residing in his Inertial Frame of Reference, and also the amount of Mass, m_2, in a specific massive body residing in the Inertial Frame of Reference related to the other Human.

Also, the Rest Mass values of the above-mentioned massive bodies are not the same, or, m_{10} is different from m_{20}.

The amount of Mass (Energy) that the first Human evaluates, related to the massive body residing in his Inertial Frame of Reference is m_{10}, because this massive body is at rest, relative to that Human.

The amount of Mass (Energy) that the first Human evaluates, related to the massive body residing in the other Inertial Frame of Reference is $m_2 = m_{20} / \sqrt{(1-v^2/c^2)}$, because this massive body is moving at a velocity v relative to that Human.

Thus, the Total amount of Mass (Energy) that the first Human evaluates related to the two massive bodies is:

$m_{10} + m_{20} / \sqrt{(1-v^2/c^2)}$

The amount of Mass (Energy) that the second Human evaluates, related to the massive body residing in his Inertial Frame of Reference is m_{20}, because this massive body is at rest, relative to that Human.

The amount of Mass (Energy) that the second Human evaluates, related to the massive body residing in the other Inertial Frame of Reference is $m_1 = m_{10} / \sqrt{(1-v^2/c^2)}$, because this massive body is moving at a velocity v relative to that Human.

Thus, the Total amount of Mass (Energy) that the second Human evaluates related to the two massive bodies is:

$m_{20} + m_{10} / \sqrt{(1-v^2/c^2)}$

And since $m_{10} + m_{20} / \sqrt{(1-v^2/c^2)}$ ***is not equal*** to $m_{20} + m_{10} / \sqrt{(1-v^2/c^2)}$ then, the two Humans arrive at ***different values*** for the Total Mass (Energy) embedded in these two massive bodies, which implies that ***Energy evaluations might be sometimes relative*** to the Human evaluating these Energy amounts, and this also implies, that at least one of the above mentioned Humans, arrived at a ***wrong evaluation*** as related to the Energy amount evaluated in these two specific massive bodies.

It might be argued, that what was just presented above is not accurate, because it did not take into consideration, how the above-mentioned Humans also evaluated the amounts of Mass (Energy) in the above-mentioned massive bodies, during any process, that might have occurred, before these Humans ended up in two separate Inertial Frames of Reference, which move at a velocity v relative to each other.

However, even if the two Humans, mentioned-above, started in being in the ***same*** Inertial Frame of Reference, then, it is reasonable to assume, similarly to what was just presented above, that in

any process, which might have occurred, which ended up in these Humans being in two different Inertial Frames of Reference, these Humans, still ***evaluated differently***, the amounts of Mass (Energy) in the above-mentioned massive bodies, during any such process, which would have ended up, in these Humans, being in two different Inertial Frames of Reference.

Because, if the first Human and the first massive body mentioned-above resided on a platform that initially resided in the Inertial Frame of Reference in which the second Human and the second massive body mentioned-above also resided, and that platform started to move, relative to the second Human mentioned-above, then, in order to end up with the two Humans residing in two separate Inertial Frames of Reference, which move with a relative velocity v, that platform must first accelerate and then stop when it reaches the velocity v.

But, at each specific moment, during that accelerating process of this platform, the first Human still evaluates the Mass (Energy) in the first massive body as m_{10}, because this massive body is still at rest relative to this Human, and, at each specific moment, during that accelerating process of this platform, the first Human still evaluates the Mass (Energy) in the second massive body as ***greater*** than m_{20}, or as $m_{20} + \delta_{1,}$ because this second massive body is moving relative to this first Human, and thus, this Human might attribute to this massive body also a Kinetic Energy.

And, at each specific moment, during that accelerating process of this platform, the second Human still evaluates the Mass (Energy) in the second massive body as m_{20}, because this massive body is still at rest relative to this Human, and, at each specific moment, during that accelerating process of this platform, the second Human still evaluates the Mass (Energy) in the first massive body as ***greater*** than m_{10}, or as $m_{10} + \delta_{2,}$ because this first massive body is moving relative to this second Human, and thus, this Human might attribute to this massive body also a Kinetic Energy.

The equation $m = m_0 / \sqrt{(1-v^2/c^2)}$ presented by Einstein's Special Relativity Theory, relates to massive bodies that reside in Inertial Frames of Reference, and thus, move at constant velocities.

But, because any moving Mass does embed also Kinetic Energy, then, it is ***reasonable to assume***, that the evaluation of the amount of Mass in a massive body that is ***accelerating*** relative to a Human, by this Human, will be also ***greater***, as compared to the amount of Mass in this massive body, that this Human will evaluate, if this massive body will be at rest, relative to this Human, even though, this massive body is ***accelerating***, and not moving at a constant velocity, relative to this Human.

And, because the Kinetic Energy that should be attributed to any moving Mass must be proportional to the amount of the Rest Mass embedded in this moving Mass, then, it is also ***reasonable to assume***, that the increase in the evaluated Mass, in this massive body, by this Human mentioned-above, will be also ***proportional*** to the amount of Mass evaluated, in this massive body, by this Human mentioned-above, when this massive body is at rest, relative to the Human that evaluates the amount of Mass in this ***accelerating*** massive body.

Thus, in the above description, since m_{10} is not equal to m_{20}, then, also δ_1 is not equal to δ_2.

Thus, at each specific moment, during that accelerating process of the platform in the above description, the first Human will evaluate the amount of Mass in both massive bodies mentioned-

above as $m_{10} + m_{20} + \delta_1$, and the second Human will evaluate the amount of Mass in both massive bodies mentioned-above as $m_{20} + m_{10} + \delta_2$, which are ***different evaluations***.

Thus, the above still implies that these two Humans will ***still evaluate differently*** the Mass (Energy) embedded in these two massive bodies, also at each specific moment, during the accelerating process of the platform mentioned-above.

Also, the above demonstrated that, even though both Humans ***started*** on the ***same*** Inertial Frame of Reference, when they ***did agree*** on the amount of Mass (Energy) in the above mentioned two massive bodies, after the platform on which the first Human resided started moving, they started to arrive at evaluating ***different values*** of the amount of Mass (Energy) embedded in the above mentioned two massive bodies.

Let's try and evaluate now if the above-mentioned Humans can explain why this happened.

One possibility which might provide such an explanation, might be a discussion on what happened, in the scenario described above, between these two Humans, maybe, sometime after they finished the above-described scenario.

In such a discussion the second Human might tell the first Human, that he can explain why the first Human evaluated the Mass (Energy) embedded in the first massive body as m_{10}, while he (the second Human) evaluated it as $m_{10} / \sqrt{(1-v^2/c^2)}$.

The second Human might say, that this occurred, because he (the second Human) noticed that an ***external Force*** was the cause of the Acceleration of the platform on which the first Human resided, and the ***Work*** done by this Force caused also the Acceleration of the first massive body, which resulted in a ***Kinetic Energy*** added to the first massive body, which caused the increase in the Mass (Energy) evaluation of this massive body by him (the second Human) which evaluated the Mass (Energy) embedded in this massive body by him (the second Human), as $m_{10} / \sqrt{(1-v^2/c^2)}$, and not just as m_{10}, as the first Human evaluated it.

The first Human might agree and might also mention, that he did suspect that an external Force might have been involved.

Thus, the above implies that the second Human, mentioned above, did evaluated correctly the amount of Energy embedded in the first massive body mentioned above, but the first Human was ***wrong*** in his evaluation as related to the amount of Energy embedded in the first massive body mentioned above, because he could not detect the ***Kinetic Energy*** added to this moving massive body.

Also, the above provides only a ***partial explanation*** to the ***discrepancies*** presented above in how the two Humans, mentioned above, evaluated the Mass (Energy) embedded in the ***two massive bodies***, mentioned above, because this ***does not explain*** yet the ***discrepancy*** in how the two Humans, mentioned above, evaluated the Mass (Energy) embedded in the ***second massive body*** mentioned above.

Because, the first Human ***could not tell*** the second Human that he also noticed that an external Force was exerted on the ***second massive body***, mentioned above, because, in the scenario

described above, only the platform on which the first Human resided started to move, while the second Human and the second massive body, mentioned above, ***did not move at all***.

The first Human did indeed notice that the second massive body moved relative to him, ***but only*** because he moved, ***and not because*** an external Force or an Energy was exerted on the second massive body.

Thus, even though, the first Human, ***did not noticed*** any external Force or Energy exerted on the second massive body, the first Human, still evaluated the Mass (Energy) in the second massive body as $m_{20} / \sqrt{(1-v^2/c^2)}$, ***only because*** the first Human did detect the ***second massive body*** as moving, and ***not because*** he detected any external Force or Energy exerted on the second massive body.

And thus, the first Human ***could not provide*** a satisfactory explanation why he evaluated the Mass (Energy) embedded in the second massive body as $m_{20} / \sqrt{(1-v^2/c^2)}$, which would explain this by a Force or an Energy exerted on the second massive body, as the second Human provided, regarding why ***he*** (the second Human) evaluated the first massive body as $m_{10} / \sqrt{(1-v^2/c^2)}$, which did provide a cause of an external Force or Energy exerted on the first massive body.

Thus, the above implies again that, the second Human evaluated, again, correctly the amount of Energy, in this case, in the second massive body, mentioned above, and the first Human, mentioned above, arrived, again, at a ***wrong*** evaluation of the Energy, in this case, in the second massive body, mentioned above, because he attributed to this massive body a ***Kinetic Energy*** which ***did not exist***.

Thus, the above still implies that ***Energy evaluations might be indeed sometimes relative*** to the Human evaluating these Energy amounts, and some of the Humans (in this case, the first Human mentioned above), might arrive at ***wrong results*** in their evaluations of Energy amounts.

Moreover, it should be emphasized, that the first Human mentioned above, ***changed his evaluation*** as related to the amount of Mass (Energy) embedded in second massive body mentioned above, from m_{20} to $m_{20} / \sqrt{(1-v^2/c^2)}$, after he underwent the acceleration mentioned above and ended in a new Inertial Frame of Reference.

And this change of evaluation occurred ***only*** because this Human detected this second massive body mentioned above as moving relative to him, ***only*** because this Human was ***himself*** moving, and ***not because*** he could point out that an external Force or Energy was exerted on this second massive body mentioned above.

Thus, in view of the scenario described above, the following important conclusions should be emphasized:

If ***a Human*** undergoes an Acceleration, and after that Acceleration, ends up in an Inertial Frame of Reference which moves with a different velocity, as related to the velocity of the Inertial Frame of Reference on which this Human resided before he underwent that Acceleration, this Human might ***evaluate differently*** the amount of Mass (Energy) embedded in the massive bodies which are ***external*** to his current Inertial Frame of Reference, as related to how this Human evaluated these same amounts of Mass (Energy), before he underwent this Acceleration.

Because this Human might evaluate differently the ***Kinetic Energy*** attributed to the massive bodies which are ***external*** to his current Inertial Frame of Reference, as the first Human, in the scenario described above, evaluated ***wrongfully***, the Mass embedded in the second massive body, described above, by attributing to it a ***Kinetic Energy*** which did not exist, because this massive body did not move.

Moreover, if ***a Human*** undergoes an Acceleration, and after that Acceleration, ends up in an Inertial Frame of Reference which moves with a different velocity, as related to the velocity of the Inertial Frame of Reference on which this Human resided before he underwent that Acceleration, this Human might ***not detect the change*** that have occurred in the amount of the ***Kinetic Energy*** attributed to the massive bodies which ***are in his*** current Inertial Frame of Reference, as the first Human, in the scenario described above, ***did not detect the change***, that occurred in the amount of the ***Kinetic Energy*** that was added to the first massive body, described above, which did move because it resided in the platform on which the first Human, described above, also resided.

Thus, the above implies, that ***a Human***, who undergoes a change of velocity (Acceleration), might be sometimes bound to evaluate ***wrongfully*** the Energies, embedded (or attributed) to massive bodies, because that Human might ***not detect*** the changes in the Kinetic Energies attributed to the massive bodies residing ***in his*** Inertial Frame of Reference, and detect ***wrongfully*** the changes in the Kinetic Energies attributed to the massive bodies ***external*** to his Inertial Frame of Reference.

The above might supports the conclusion, presented already before in this paper, that evaluations of Energy amounts by Humans might be sometimes ***relative*** to the Human evaluating these Energy amounts.

2. Limitations in what was presented in the previous chapter of this paper

The previous chapter of this paper presented a scenario which implied that evaluations of Energy amounts by Humans might be sometimes relative to the Humans who executed these Energy amounts, and also, that Humans might sometimes arrive at significantly wrong results when evaluating Energy amounts.

However, it turns out that although the above-mentioned scenario might indeed occur, and Humans might result in significantly wrong evaluations of Energy amounts, such a result is a special result, and usually, evaluations of Energy amounts by Humans, as presented in the previous chapter of this paper, does result in more complicated outcomes.

A simple example to the above might be a scenario of Humans in a moving train which might be considered an Inertial Frame of Reference.

Although Humans in such a moving train will notice the items external to the moving train as moving, these Humans will not conclude that these items, external to the train, are indeed moving, because these Humans do know that they are moving, because they are in the train which is moving.

It should be emphasized, that the scenario presented in the previous chapter of this paper concluded, that Humans might arrive at significantly wrong evaluations of Energy amounts, if they are indeed moving, but are not aware of the fact that they are moving, or are not able to evaluate with enough confidence the velocity of their movement, and also, if they cannot evaluate with enough confidence if items external to their current Inertial Frame of Reference are moving, and also, if they cannot evaluate with enough confidence the velocities of these items external to their current Inertial Frame of Reference.

In addition to the scenario of Humans in a moving train, presented above, it should be emphasized, that Humans can utilize various ***technological means***, which Humans devised, which will provide them a reasonable good indication if they are moving and also provide them a reasonable good indication of the velocity of their movement, and also provide them a reasonable good indication if items external to their Inertial Frame of Reference are moving, if these Humans do encounter these external items and are aware of their existence, and also provide them a reasonable good indication of the velocities of these external items relative to the velocities that these Humans attribute to their Inertial Frame of Reference, such that these Humans do not necessarily have to depend only on their feelings and their consciousness in order to decide if they are moving or items external to them are moving.

Thus, in scenarios such as the scenario which is presented in the previous chapter of this paper, Humans do arrive at significantly wrong evaluations of Energy amounts only in situations in which Humans are stranded in an Inertial Frame of Reference in which they cannot figure out if they are moving, and they ***cannot utilize technological means*** which will provide them with good indications if they are moving, what is the velocity of their movements, and if items external to their frame of reference are moving and what are the velocities of these external items.

An example of such a scenario might be a scenario in which Humans reside in a Space Station, deep in Space, where their technological means are not capable of providing good information about their movement and the movements of items, that they might encounter, external to their Space Station.

Thus, such a scenario is indeed a special scenario.

3. Humans might also have difficulties in evaluating exactly amounts of Kinetic Energies

Although the situations in which Humans might be evaluating Energy amounts significantly wrong might be special, as presented in the previous chapter of this paper, the Scenario presented in a previous chapter of this paper, about two Humans in two Inertial Frames of References does result in a conclusion which implies that Humans do have a basic additional limitation in ***exact*** evaluations of Energy amounts.

In the following, the scenario presented in a previous chapter of this paper, about the two Humans in two separate Inertial Frames of References, is denoted as Scenario1.

The following presents the conclusion that despite the fact that a scenario in which Humans might evaluate significantly wrong Energy amounts might be a special scenario, as presented above, Scenario1 does result in a conclusion that Humans might ***not be able*** to arrive at the ***exact*** Energy amounts embedded in moving massive bodies, ***because velocities are relative***.

Since Mass is Energy, and the amount of Energy embedded in any massive body depends also on the Kinetic Energy embedded in this massive body, Humans must know the exact value of the velocity of any massive body, in order to arrive at the ***exact*** value of the Energy embedded in this massive body.

But, if a Human tries to evaluate the exact Energy embedded, for example, in a massive body which resides on planet Earth, then, this Human must take into account the velocity that this massive body has because of planet Earth movement, and the velocity the planet Earth has because of its movement together with the movement of the Milky Trail Galaxy, in which planet Earth resides, and the velocity of the Milky Trail Galaxy in the group of Galaxies this Galaxy belongs to, etc.

Since Humans cannot arrive at the ***exact*** velocity of this massive body in the ***entire Universe***, Human ***cannot*** arrive at the ***exact*** amount of Energy embedded in this massive body.

The above is analogous to the conclusion, presented already before in this paper, when elaborating on the details related to Scenario1, that if a Human is not able to detect the fact that he is moving, or the exact velocity of his movement, this Human might not be able to evaluate ***exactly*** the additional Kinetic Energy that should be attributed to any massive body which is residing in his Inertial Frame of Reference, as the first Human presented in Scenario1 was not able to evaluate the Kinetic Energy attributed to the first massive body presented in Scenario1, because this massive body was not moving relative to this first Human, although this first Human and this first massive body were indeed moving.

And, in addition to the above, since a Human cannot arrive at the ***exact*** velocity, in the ***entire Universe***, of massive bodies in his Inertial Frame of Reference, then, this Human cannot also conclude what is the ***exact*** velocity, in the ***entire Universe***, of any massive body, external to his Inertial frame of Reference, which implies, that this Human cannot evaluate ***exactly*** also the Kinetic Energy that should be attributed to any massive body, external to his Inertial Frame of Reference.

The above is analogous to the conclusion, presented already before in this paper, when elaborating on the details related to Scenario1, that if a Human is not able to detect if an item external to his Inertial Frame of Reference is moving, or the exact velocity of the movement of this external item, this Human might not be able to evaluate ***exactly*** the Kinetic Energy of this external item, as the first Human presented in Scenario1 attributed wrongfully a Kinetic Energy to the second massive body presented in Scenario1, although this second massive body was not moving.

Thus, also, as presented above, a scenario such as Scenario1, in which Humans might arrive at completely relative and wrong evaluations of Energy amounts, might be a special scenario, the above does imply, that what was presented in Scenario1 does indeed imply that Humans might have ***a basic significant limitation***, in evaluating exactly the Kinetic Energies embedded in

massive bodies, and this limitation is a special facet of the limitation that Humans have, in not being able to evaluate ***exactly*** the Energy embedded in the entire Universe.

4. Implications to what was presented in this paper.

This paper elaborates on arguments which state that Humans might have difficulties in ***exact*** evaluations of Energy amounts because:

- Humans cannot arrive at an exact amount of the Energy embedded in the whole Universe, in order to state with complete validity that Energy is always conserved, as the Energy Conservation Principle implies.
- Humans recognize that most of the Energy embedded in the Universe might be Dark Energy, which Humans might not be able to detect or evaluate exactly its amount.
- Humans might not be able to evaluate exactly the velocity of massive bodies, and thus, Humans might not be able to evaluate exactly the amount of the Kinetic Energy embedded in massive bodies, which implies that Humans might not be able to evaluate exactly the Total Energy embedded in massive bodies.
- In certain special scenarios, the evaluations of Energy amounts by Humans might be also relative to the Human who evaluated these Energy amounts.

Thus, on one hand, one might jump to a conclusion, which one might derive from what was just presented above, that the Energy Conservation Principle might not be ***completely*** correct.

One might also support this conclusion by the fact, that the nowadays Science of Physics does agree that in addition to the Detectable Energy, the Universe embeds a very large amount of undetectable, or Dark Energy, (about 70% of the estimated Total Energy which is estimated to be embedded in the whole Universe is estimated to be Dark Energy), which might further imply, that Humans cannot evaluate the actual amount of the Total Energy embedded in the Universe, which might further support the assumption, that Humans cannot prove, that all the Energy embedded in the Universe, is indeed conserved.

However, on the other hand, even though the paper does highlight problematic issues in Humans exact evaluations of amounts of Energy, it should be emphasized, that this paper ***did not*** present a conclusive result which implies, that the Energy Conservation Principle is a false principle.

The Science of Physics states that the laws of Physics are the same in all Inertial Frames of Reference.

Thus, in view of the above, and since the Energy Conservation Principle is a very significant corner stone of the Science of Physics, still, the reasonable conclusion that one might conclude, should be, that despite what was presented in this paper, that Humans might have difficulties in exact evaluations of Energy amounts, ***the Energy Conservation Principle should be still considered a viable principle***, but Humans should also recognize the fact that Humans cannot provide a definite proof for the Energy Conservation Principle, and Humans should accept this principle only as an axiom.

Moreover, the statement that the laws of Physics are the same in all Inertial Frames of Reference should imply that ***each*** Human, residing in an Inertial Frame of Reference (which means that this Human moves at a constant velocity), might still detect ***Energy Conservation*** in ***his*** specific evaluations, especially if the evaluations related to each Human are ***limited*** to what this Human can evaluate, and not to the Energy embedded in the whole Universe.

Thus, although the reasonable conclusion presented above, that Humans can still relate to the Energy Conservation Principle as a viable principle, still, what was presented in this paper, that Humans might encounter basic limitations in exact evaluations of Energy amounts, should be also taken into consideration.

And, even though this paper does conclude that Humans might be able to provide validity to the Energy Conservation Principle, what was presented in this paper should point out a ***significant limitation*** that Humans might have in Humans endeavors to achieve a deep and comprehensive ***understanding of the Universe or the Existence***.

The author of this paper published a paper: " Energy Might be the Only Unique, Distinct and Independent Entity in Nature." (3).

This paper presents the possibility that the Universe is composed of only one distinct and independent entity, Energy. This implies that also Humans are composed of only this distinct and independent entity, Energy.

And thus, since it is impossible to figure out completely an issue just by using this same issue, Human minds, being just an aggregate of forms of Energy, might not be able to figure out completely what is Energy, and what are all the details for understanding all the elements involved in all the interactions between Energy forms, and this might provide some explanation to the Humans limitation presented above.

5. Summary and Conclusions

The paper states that the Energy Conservation principle, which is considered a corner stone of the Science of Physics, actually implies that the Total amount of the Energy, which is embedded in the whole Universe, must be a constant value, because otherwise, this would imply that Energy can either disappear or be created from nothing, contrary to what is implied by the Energy Conservation principle.

The paper then elaborates on arguments which state that Humans might have difficulties in exact evaluations of Energy amounts because:

- Humans cannot arrive at an exact amount of the Energy embedded in the whole Universe, in order to state with complete validity that Energy is always conserved, as the Energy Conservation Principle implies.
- Humans recognize that most of the Energy embedded in the Universe might be Dark Energy, which Humans might not be able to detect or evaluate exactly its amount.

- Humans might not be able to evaluate exactly the velocity of massive bodies, and thus, Humans might not be able to evaluate exactly the amount of the Kinetic Energy embedded in massive bodies, which implies that Humans might not be able to evaluate exactly the Total Energy embedded in massive bodies.
- In certain special scenarios, the evaluations of Energy amounts by Humans might be also relative to the Human who evaluated these Energy amounts.

The paper then elaborates on the Implication of the above, on whether this might render the Energy Conservation Principle to ***not be completely*** correct, or whether Humans still can decide that the Energy Conservation principle is a valid principle.

The paper does conclude that Humans should conclude that ***the Energy Conservation principle is a valid principle***, but still, what is presented in this paper, might also point out a significant limitation that Humans might have in Humans endeavors to achieve a deep and comprehensive understanding of the Universe or the Existence, if Humans cannot provide a complete proof to a very significant building block, or corner stone, of the Science of Physics, the Energy Conservation principle.

References

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