What is the minimum number of energies or forces required to reproduce our universe?

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The existing pre-fermion hypothesis based on a single type of particle/anti-particle as the only real objects in the universe with only a single type of composite composed of pairs of those particles, not overlapping, and chasing in a loop form that can reproduce the energies and forces that we observe (other than the full anomalous magnetic moment of the charged leptons) using only two fundamental energies or forces due to fundamental mass and charge. Our observable energies or forces are emergent from the composite loops, their motions and their stacking. This paper looks at whether it is possible to reduce the two energies of those particles to a single fundamental mass energy, with the fundamental charge being a reaction by the background material of the universe – which is made from the same particle/anti-particle pairs but always partially merged together. The conclusion is that, whilst it is possible to manage with one particle energy and a background reaction in the relativistic environment, it is not possible in the quantum environment where the background is absent. Two types of fundamental energy or force within the particle/anti-particles are the minimum required.

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Introduction

The pre-fermion hypothesis on which this paper is based is detailed in a number of published and pre-print papers [1, 2, 3, 4, 5]. The hypothesis is that all our observable particles, and the background through which they move, are composed of a single type of particle/anti-particle, each with only two different types of fundamental energy, which always balance to zero overall, and form either only a single type of basic composite moving structure with non-overlapping particle/anti-particles mutually chasing each other – a loop – or alternatively, when partially overlapping, form partially merged pairs and, when fully overlapping, form zero mass black holes.

Significance and Objectives

The significance of the paper is in taking a current hypothesis that can successfully reproduce most of the observations throughout the universe and then, using a different interpretation of those observations, examine whether it cannot be made simpler. The objective is to try to reduce the number of types of energy required to produce the observations within relativistic and quantum systems to less than the two that is the lowest number required in the current hypothesis [6, 7, 8]. The conclusion is that the current hypothesis is the simplest possible and two energies are required, but the examination is useful in clarifying aspects of that current hypothesis.

Outline

In brief, the tiers of what constitute space, the background, and observable particles in the current hypothesis are that:

Firstly, the only real particles that exist in the universe are positive and negative black holes of Planck size (adjusted to produce internally consistent Planck properties and units [9, 10]). The positive particle has positive fundamental mass and positive fundamental charge, with the negative particle having the reverse. Symmetrically, where positive fundamental mass attracts positive fundamental mass, negative fundamental mass attracts negative fundamental mass. Charge has the usual interactions between positive and negative charges. Because these particles are the densest black holes possible, they cannot be broken and so there are no singularities in the universe.

Secondly, when the positive and negative particles are either partially merged as ‘pairs’ or fully merged as zero mass black holes, a myriad of them form the ‘background’ of the universe. The background is the material from which everything in the universe is made, whether in merged or unmerged form, with the latter being what moves through that merged form background.

Motion through the background requires energy and results in the relativistic environment where the viscosity of the background produces a maximum speed of travel through it by unmerged particle/anti-particles dependent on the local background density, which we call light speed. The background is a continuous material in that the partially merged pairs overlap, translate, rotate and oscillate and then form chains, where pairs have aligned due to their individual fundamental mass and charge fields, which

transfer all forces. The only energies present are due to the fundamental mass and charge of the particles - all other energies and forces are emergent from the motions of the composite unmerged meon forms – the loops.

Thirdly, when a partially merged pair is unmerged during a big bang event, the resultant unmerged particles twist (spin spirally as they translate) to generate positive or negative one-sixth the electron charge whose energy balances the mechanical spin energy. The sign of charge depends on the twist orientation and sign of particle, but an unmerged pair always generates both positive and negative one-sixth charges, totalling zero overall. This is a quantised system since there are only two sizes of total mass and charge for each sign of twisting particle/anti-particle.

Fourthly, the unmerged particle pair will chase each other, and be chased, in one or other direction along the line between them, since they are of opposite fundamental mass type, and try to remerge together. A pair will continue to chase until they catch onto other such unmerged pairs to form chains – which will then catch onto their own tails to form loops.

Loops of three pairs are our quarks and leptons. Loops of other pair number are dark matter. This is a further quantised system in that the total charge of any three pair loop will be ± 1, ±2/3, ±1/3 and zero electron charge. The size of the loops formed will depend on their charges and the amount of inflation along each of the three spatial axes, producing three families of loops of different sizes.

Each big bang event has its own size of loops equivalent to our quarks and leptons because our own is not the only big bang event within the background that constitutes the material of the much larger universe. Other big bang events are occurring randomly throughout the total universe but mostly failing to expand significantly because of insufficient rates of inflation.

It is the loops that are observably subject to the background viscosity in relativistic systems – but it is the effect of that viscosity on the loop components, the particle/anti-particles, that matters – not the size of the loops (the radii at which the particle/anti-particles rotate, and thus the loop frequency). Other than at very high frequencies, the same amount of viscosity affects loops of large size and small size over the distance that the same number of particle/anti-particles that compose those loops travel, resulting in frequency-independent ‘tired’ light in photons.

Energy consideration - current hypothesis

The current hypothesis for the underlying material of the universe is effectively zero mass black holes, which are composed of those positive and negative fundamental particles – now called positive and negative meons – completely merged. The positive meon is assumed to have adjusted-Planck size fundamental positive mass and fundamental positive charge, so that it has zero total energy overall. The negative meon is assumed to have the adjusted Planck size fundamental negative mass and fundamental negative charge, again totalling zero energy overall. When the overlap is complete, meaning the two are completely merged, then there is nothing observable at all. When the two are only partially merged, there are mass and charge fields along the axis between the pair (internal) and all external forces are transmitted by chains of these partially merged pairs aligned together.

The background is composed of a myriad of these zero mass black holes (fully merged pairs) and the partially merged pairs so that there is always overlap in a relativistic environment and the change in density of the background locally is smooth, although it may change in overall density near to large celestial objects. Since the meons are the densest objects possible, there are no singularities and they cannot be broken apart, even in supermassive black holes.

The hypothesis based on this system uses only fundamental mass and charge within the meons and, when a partially merged pair has become unmerged, the composite formation of is only of loops constructed of chains of unmerged positive and negative meons, each chasing the one in front. On initial unmerger, the meons twist about an axis along their direction of travel and generate one-sixth the charge on the electron, positive or negative depending on the meon sign and orientation of twist along the direction of motion. Equal amounts of positive and negative one-sixth electron charge are generated in every unmerger. And negative meon masses attract other negative meon masses, just as positive meon masses do to each other, but chase, and are chased, in opposite type meon interactions.

Charge consideration – reinterpretation

It may be possible to simplify this system even more in the relativistic environment which is within the background.

If the background is compared with a flow of

electrons, for example, where there are gaps in which electrons are not present, those gaps can be considered to be positrons within the overall flow. In much the same way, it would be possible to consider that the unmerger of an reinterpreted positive meon, having only positive fundamental mass but no charge, could be considered to be the creation of an opposite type energy within the background, centred on that positive meon, leaving the total of background plus meon having overall total energy of zero. The same would be the case for the unmerger of a reinterpreted negative meon, with consequent opposite type background energy – also opposite to that created by the positive meon.

These two created background energies could be called positive and negative charge, of equal size to the meon mass energies. This is different to the current system in that now the meons only have mass energy and it is the background that creates the balancing opposite type background charge energies, identified now as the charges. Currently it is assumed that the meons have both mass and charge energies already, which total zero overall.

The result would be that the meons only have mass energies and the charges are created by their effect on the background. This would also be the case for the partially merged pairs, where the charges created would be directly proportional to the volume of meon that is unmerged.

The charges considered so far would be called fundamental charges, in that they relate only to partially merged meons and stationary unmerged meons. What is currently hypothesised to be observed in loops is the total of the one-sixth electron sized charges that each meon is considered to generate as it twists against the local background, having been unmerged, making a three-pair loop into either a quark or a lepton.

In the new interpretation, for example, the LHS twist of a positive meon, having positive fundamental mass, against the background could be consider to produce positive one-sixth charge, with the RHS twist of a negative meon generating the same sign one-sixth charge. The negative one-sixth charge would refer, in this case, to the RHS twist of a positive meon, having positive fundamental mass, and LHS twist of a negative meon. Since unmerged meons initially chase/are chased and twist in the same orientation as they travel, both sign one-sixth charges would always be generated on unmerger and always the same size of charge.

This background charge generation could be considered as the preference for LHS twist motion, as in both cases the result is an overall increase in the total of fundamental charge plus one-sixth charges. The RHS results in a reduction of the fundamental charge by the one-sixth charge. The mass twist energies that are the generators of the one-sixth charges increase/decrease in the same sense as the charges, so that the total energies present are always zero.

The present hypothesis assumes that there is the underlying symmetry that positive mass twisting one way against the background produces one sign of one-sixth charge and positive mass twisting the other way produces the opposite, and vice versa for negative mass twisting. Although this is symmetric at the fundamental level, in the reinterpretation it produces asymmetric outcomes in the loops formed when their own rotation (spin) is taken into account.

To address this issue requires some further reinterpretation, although this does not change the methodology of the loop formation. What is needed is to accept in the new interpretation that the background is not a neutral partner in the twisting interaction – that it prefers one twist orientation and actively pulls that orientation along the direction of travel whilst resisting the other.

This would mean in the new interpretation that a twist energy that increased the total mass energy of a meon is now provided by the background, with the charge result the same as previously. And a twist energy that reduced the total mass energy of a meon is now given to the background by the meon, with the charge result the same as previously. So the background becomes a more active participant, although for each unmerger the total effect on and by the background is zero, just as previously.

This means that now the charge generated by rubbing against the background is now a measure of the energy transfer between the background and the meons – and the loops.

Again, in the new interpretation, these one-sixth charges can be considered as the balancing of the mass twist energies by the background itself. The charges then become the reflection of the size and type of the fundamental mass and twist energies.

The interaction between charge signs then becomes due to the underlying drive for the background to have zero total energy of each type in the same spot in the background. The charges wish to balance different

signs to zero (attracting) whilst not wishing to increase their same sign effects (repelling). The mass energies have the same drive to reduce opposite signs to zero, but have no issues with increasing their same sign size at the same spot.

There is no overall effect of the change in interpretation expected, within a background environment, since in each case there is always a zero total energy in respect of each meon and the loops that they form. The difference is in what the charge is due to – inherent within each meon, with twist generated one-sixth change in charge due to rubbing the background, or alternately due to the mass energy of the meon acting on the background and the background responding.

Without a background?

There are though possible differences between the interpretations, in that the fundamental and one-sixth charges now may depend on the local density of the background and its effect on the meons. This is most pertinent in the tunnels and double shells of the quantum mechanical interpretation [11, 12], where there is no background present – meaning no terminal velocity for loops. It is possible that the stability of the loops would be affected within those environments because only the meon fundamental mass energies would be acting – but without the background to transmit those forces between the meons in the loop, that may not be an issue.

The current interpretation is that the direction of twist coupled with the sign of meon produced the sign of one-sixth charge generated because the twist energy was either the same sign as the underlying meon mass energy, or opposite. This additional, or reduction in, mass energy resulted in the radii of rotation within a loop of the meons being of only two sizes in order that every meon always had the adjusted-Planck size of angular momentum around the loop. This in turn produced the main component of the electron spin g factor value g=2 and part of the anomalous magnetic moment of the loop because the magnetic moments of the one-sixth charges could not total zero, except in neutrino loops.

It is the question of how it can be said that the twist energy is the same type as the fundamental mass energy of a meon and how the background, the zero mass black holes and merged meon pairs that have not unmerged, produce the one-sixth charges. This is a question of symmetry at the most basic level and can be extended to suggest that the loops themselves have a preferred spin orientation when in motion.

It is the ‘rubbing’ by the meons as they move through the background that is presumed in the current hypothesis to generate the one-sixth charges, with the size of charge dependent on the twisting rotational frequency and the local background density. Where there is no background – in entanglement tunnels and within photon emission shells - there is no charge generated and indeed, because it is chains of partially merged pairs attached to each meon within a loop that drag through the background that generate what is observed as the mass of the loop, without the background there are no forces transmitted beyond the loop anyway.

On the observable mass of the loops, which it might be expected would be directly related to the rotational frequency of the loop; there is an additional factor involved. As a loop rotates, the meons passing a point in the background will be either LHS or RHS twist orientation. If the orientation of the next meon in the loop changes from LHS to RHS, or vice versa, the background receives a flip in its rubbing direction that is transmitted via the attached chains as a measure of the observable mass of the loop, worth one-sixth of the loop frequency.

The direction of the flip, RHS to LHS or LHS to RHS is immaterial, so that the observable mass of the loop is a fraction represented by the number of flips around the loop divided by the maximum six possible flip events. Where there is no flip between adjacent meons, there is no effect on the background and these events do not transmit the loop frequency as part of the observable mass of the loop.

This means that the electron and positron, both with six flips around their loops, will show 100% of their frequency as their mass.

For symmetric neutrinos, being either ‘big’ or ‘small, type as described below, there are no flips in either type, as they each have the same twisting orientation for each meon/anti-meon, and so no mass observable.

For asymmetric neutrinos, the observable mass depends on the twist orientation and meon position around the loop, giving different flip numbers for different isomers. Such a loop could show an observable mass of 1/3 or 2/3 of the loop frequency. This suggests that a mixture of neutrino types within each family could be responsible for the observed very small mass of ‘neutrinos’. If the number of asymmetric neutrinos in a beam of symmetric neutrinos were very small, since they are unlikely to survive long in their asymmetric state, then this may

be the case and could be proved by filtering out the asymmetric neutrinos in some way.

The up quark/anti-up quark will always have four flips and will therefore always show an observable mass of 2/3 its loop frequency.

The down quark/anti-down quarks have numerous isomers, all asymmetric and can show an observable mass of either 1/3 or 2/3 of their loop frequency, depending on the positions and twists of the meon/anti-meons in their loops. Again filtering may enable a split between the two mass isomer types.

Previously it was considered in the current hypothesis that it was the net charge on the loop that set the fractional observable mass effect, but it was not clear how that got transmitted to the background. By suggesting that it is the flipping of twist orientation between adjacent meons that affects the background, it is possible to ensure that the same fractional observable mass effect occurs for both a loop and its anti-loop, as well as producing a possible source of observable mass in neutrinos.

The axis of the motion of loops is generally considered to be perpendicular to the plane of rotation of the meons, although this is not necessarily the case when external electric or magnetic fields are present. But generally this means that relative orientation of the spiral motion of the loop as it travels, and the meon twisting direction as they rotate around the loop, are at right angles.

How the two effects specifically interact are difficult to model, but can be said to change the size of the charge on the loop since the relative orientation of any meon twist will no longer be solely along its direction of travel and the meon will be travelling faster than they would be in a loop that is rotating whilst stationary in its stationary frame of reference.

What this means is that, following the same reinterpretation of the background pulling or resisting one rubbing orientation over the other, there may be a preferred direction of loop spin when a loop is in motion in a frame of reference. That direction will be to increase the charge on the loop because that charge is just a measure of the energy of interaction between the meons and the background.

This then would produce the effect posited previously [13, 14] that the magnetic moment of loops in cyclotrons and Penning traps depends on the frequency of rotation of the loop within the apparatus used.

Additionally, the use of charge as a measure of interaction energy means that a positive charge represents the amount of energy that a body has taken from/given to the background and a negative charge represents the opposite. But the total of the two energy transfers must overall sum to zero, as is the case for charges themselves when considered simply as charges.

However, the basic question of how a loop, in the reinterpretation of an active background, stays together in an environment with no background is difficult to answer.

Such an asymmetry in interaction of twist orientation with the background would mean that there is a preferred spin for one symmetric isomer of the neutrino loop, and the reverse for another symmetric neutrino loop isomer. This is because a symmetric neutrino loop has all its component meon/anti-meons twisting in the same orientation as they rotate around the loop. Either all meons/anti-meons in the two symmetric loop isomers twist to increase their total charge size (big) or to decrease their total charge size (small) by the one-sixth charge. Here big and small refer also to the relative size of the radius of each meon's rotation in the neutrino loop.

Whether this asymmetry really extends to the loops is not clear. A photon composed of electron and positron rotating in the same plane and with the same rotational axis will be a mix of what are effectively six partially merged pairs chasing/being chased from loop to loop. Three pairs across the loops will be small and three pairs big, all rotating as the overall loop travels. There is no reason to have a preferred loop spin orientation because, other than the direction of travel of the photon, there is complete symmetry (although there will be a fine angled wedge across the plane of the loops where some of the partially merged pairs will be more or less merged, in order that the rotating electric and magnetic fields of the photon can be observed).

It may be that the twist asymmetry of the meons with the background leads to only spin +1 photons and LHS neutrino loops due to the background asymmetry.

With a tunnel, since there is no background inside, then no charges should be generated by twisting meons, in either the current hypothesis or the reinterpretation. So loops travelling inside tunnels will be chargeless – either because the background is not being rubbed or because there are no partially

merged pairs to transmit the charge force.

It may be that the energy that is not present as charge is part of what keeps a tunnel open.

It is likely that partially merged pair chains within loops, stretching from unmerged meon to unmerged meon, in the non-active background interpretation, may be retained within tunnels in order to maintain loop structure. But the external 'attached' swirling chains are unlikely to be maintained because they would extend beyond the tunnel size – which is only sufficient to accommodate the loops themselves. These attached chains may detach and form the tunnels as loops of partially merged pairs themselves as the tunnel extends. The lack of swirling chains means that the loops in a tunnel should also have no observable mass, since they are not affecting the background. This may be one observable aspect.

New swirling chains will re-attach on the meons in a loop at the tunnel ends to show the 'mass' and charge of the loops externally.

It is not clear how to maintain ring shape inside a tunnel if there is no charge within the meon/anti-meons - in the one-energy hypothesis there would be only mass-mass interactions at work.

It is also not clear what reflects loops at tunnel ends, other than the differential pressure of the external background versus the internal non-background.

Loops, in either hypothesis, have no attached force transmission chains operating inside tunnels - only the loop frequencies are still operating – so no observable 'mass' or loop charge beyond the loop itself.

So loops will pass through each other in tunnels and, since they cannot lose energy to the background, will maintain frequency whilst inside tunnels.

Tunnels will change size as they travel and will increase in diameter. But loops will maintain the size at which they initially created the tunnel because they cannot lose energy in the absence of the background, until the tunnel evaporates – at which point any energy change by the tunnel will be reflected in a change in loop size and frequency.

Conclusion

Whilst the reduction in the number of types of energy, required to reproduce the universe, to a single type might be possible in a relativistic environment, it fails in the quantum environment. There are some positive aspects in the one-energy potential reinterpretation, but the foundation of pairs of particle/antiparticle with both mass and charge energies within themselves offers greater simplicity across both environments.

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