Analysing and defining matter and anti-matter in a pre-fermion framework

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Analysis shows that the definition of what is matter and what is anti-matter is currently based on a misunderstanding. Using a pre-fermion framework to build fermions from a single type of particle/anti-particle concludes that, in general, if particles with positive charge are considered to be matter, then particles with negative charge will be anti-matter. There exist composites which have components of both and may be overall matter or anti-matter, even if their total charge is zero. This extends from the foundation level of pre-fermion particles up to composite stacks of loops, such as protons and neutrons, as well as other baryons and mesons.

Using the analysis, the proton is a matter particle and the neutron is an anti-matter particle, despite its zero charge, so that the reason why nuclei are more stable when formed from equal numbers of each is that the resultant nuclei are overall neutral-matter composites whose total charge needs to be balanced by an orbiting opposite charge electron to form a stable atom.

The Standard Model definition of the up and down quarks, electron and neutrino as the 'regular' fermions which are left-handed is also incorrect, as it is only the fermion matter versions (up quark, anti-down quark, positron and neutrino) that have a preference for left-handed travel, with the anti-matter versions (electron, anti-up quark, anti-neutrino and down quark) having a preference for right-handed travel.

Anti-matter is hiding in plain sight within mesons, baryons, nuclei and atoms and is completely symmetric with matter overall, although our local environment is overwhelmingly based on the longer stacks being made from net matter loops (based on the choice of positive charge as matter). There is no matter/anti-matter asymmetry in the universe and matter and anti-matter do not annihilate on contact.

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I. INTRODUCTION

The treatment of the fermions that are most frequently encountered as the 'regular' particles in the Standard Model [1] leads to a misunderstanding based on the contention that our local environment has the same foundations as everywhere else in the universe – notwithstanding that there may be opposite type fermions dominating elsewhere.

This leads further to the definition of those 'regular' particles as matter, and their anti-particles as anti-matter. The consideration that, since the partner anti-particle to a positive charge spin + ½ matter particle will be a negative charge spin + ½ anti-matter particle, then all positive charge particles will be matter and all negative charge particles anti-matter does not seem to have been undertaken.

Doubtless this is due to the nucleii of atoms being composed of zero charge neutrons and positive charge protons (both currently defined to be matter) and the belief that matter and anti-matter annihilate on contact, so there could be no anti-matter particles within nucleii.

If instead the contention were as hypothesized here, that generally all positive charge particles are matter and all negative charge particles anti-matter, then many features of mesons and baryons will be better understood and the complete symmetry of matter and anti-matter explained.

In previously published papers on a pre-fermion hypothesis [2, 3, 4, 5] the explanation of why, in general, positive charge meons and loops are matter and negative charge meons and loops are anti-matter was undertaken. This paper provides greater detail and examines the resulting stack properties, including relative velocities and handednesses.

The paper is written as if everything hypothesized is correct and does not cover issues, and definitions, that the previously mentioned papers treat appropriately, such as photon structure, background composition, meons, zero mass black holes, and merged/unmerged meon pairs.

II. SIGNIFICANCE and OBJECTIVES

The significance of the new interpretation is that no further consideration need be made on why there is an apparent asymmetry between matter and anti-matter. There is no asymmetry. And anti-matter loops coexist within our composite stacks – the mesons and baryons – as well as anti-matter meon pairs within the fermion loops themselves.

The objective is to produce an explanation that is simple and yet covers some of the previously unexplained phenomena associated with mesons and baryons, as well as correcting basic misunderstandings and definitions of matter and anti-matter.

III. EXPLANATION

Attempting to clarify the current definitions of what is matter, and what is anti-matter, starts by agreeing that the difference between a charged particle and its anti-particle is only the charge that each has. However, that is almost the only point of agreement.

The currently accepted definition of ‘regular’ fermion particles [1] as the up and down quarks, electron and electron-neutrino, which each are Left-handed (LH) when in motion, is the first confusion. If charge is the defining line between matter and anti-matter, then generally the matter particles must be those with positive (or negative) charges and the anti-particles those with negative (or positive) charges. The issue of LH or RH handedness definitions will be considered further later.

By choosing, for example, the proton as a matter particle, it effectively defines all positive charge particles as matter and all negative charge particles as anti-matter. It is not quite that simple, as will be shown below in the cases of neutrinos and neutrons, but it is the right place to start.

So the ‘regular’ particles are really the positive charge up and anti-down quark, positron and, as will be shown later, the electron-neutrino, regardless of loop spin direction. But this needs to be built up from scratch as detailed in Table 1 which looks at the foundational building blocks from which the fermions are constructed.

The table starts with the properties of zero mass black holes, as completely merged positive and negative meons, then shows how the properties alter as the meon pair first become only partially merged, then fully unmerged with resultant equal and opposite mass twist and twist-generated charge energies. The two maximum positive and negative charge combinations of the pair are shown after the original total zero charge pair. At each stage which is the matter, and which the anti-matter, meon is shown and whether the pair can spin, vibrate or translate.

The definition of neutral matter (0matter) is that there are an equal number of matter (+matter) and anti-matter (-matter) components – which, as will be shown later, is not necessarily the same as looking at the overall sign of the charge of the composite under consideration. In Table 1 because there is always a +matter and –matter component, each composite merged or unmerged pair with total zero charge is 0matter. Unmerged charged pairs will take the matter/anti-matter sign of the overall charge of the pair.

In the analysis that follows, whether a quark or lepton is from a different generation is ignored because the generations only represent different sizes of the same loops. So, for example, the muon can be converted into the electron, or vice versa, by subtraction/addition of rotational frequency – meaning loop mass and magnetic moment.

IV. THREE MEON-PAIR COMBINATIONS

Table 2 shows the only different combinations possible for loops made from three meon-pairs using only unmerged meon pairs, which are our normal matter and anti-matter composites. These three-pair loops are our fermions, which each have spin ±½ *h*.

In the table, the line of meon positions with arrows to the right in the last column is indicating that the line is a chain moving to the right and once the meon at position 6 catches onto the tail of the chain of meons at position 1 by looping ‘under’ the page, then a loop has been formed. This motion to the right and loop orientation viewed from below is defined as being spin + ½ for each loop.

It is hypothesised that if the meon at position 1 is a positive meon ($+M+Q$) that twists clockwise it produces $+q/6$ electron charge, using $-sc^2/6$ energy to twist, and a similarly clockwise twisting negative meon ($-M-Q$) produces $-q/6$ electron charge, using $+sc^2/6$ energy.

The loops where the meon at position 1 is a $+M$ are all overall positive charge (or zero in the case of the neutrinos) and are the real ‘regular’ loops. Their anti-loops are formed simply by swapping each meon for its opposite meon, so that all the anti-particles have $-M$ at position 1, whilst keeping the twist directions unchanged. It is only to pin down the definition of a loop and an anti-loop that the meon at position 1 is chosen to be $+M$ or $-M$ since the starting point for any definition could be at any meon position, so that the overall loop charge is not necessarily decided by what is that first meon.

Changing the direction of initial chain spin to the left would produce – ½ spin in all the loops, but without changing twist orientations would change the charge generated by each meon, so that what the list states currently as a positron spin + ½ would become an electron spin – ½ . However, the latter is not the anti-loop of the positron, since particle and anti-particle always have the same spin direction.

The actual situation is that, on initial unmerger, the meon pair will have non-changing twist orientations, and thus signs of $sc^2/6$ and $qc^3/6$ energies, dependent on their initial direction of chasing each other to try to reform a merged pair. These signs cannot be changed. So the chains to which the pair subsequently becomes attached must have the same direction of travel and that all meons within that chain will each never change their initial charge signs.

A loop then formed from such a chain will have its total charge set by the total unmerger charges of the meons. This means that it is not possible to consider reversing the direction of initial chain spin in order to reverse twist orientations or meon signs. A loop, once formed, will maintain its meon charges and a spin + ½ loop can only become a spin – ½ loop by flipping over physically.

If the first chains formed were from only original unmerged pairs, as shown in Table 1, then all loops would be symmetric neutrinos, as each pair would contribute both $+q/6$ and $-q/6$ electron charges. So there must be chain breaking and reformation in order to produce other loop types.

This analysis shows that the underlying meon positions, twists and direction of formation make simplistic definitions of electrons as left-handed when translating as meaningless. A spin + ½ electron flipped over will be a spin - ½ electron and each will have a different LH/RH orientation depending on which way it subsequently translates, if that is how handedness is defined.

However, there is a difference between the formation of loops with + ½ versus – ½ spins. The difference and its consequences for stack formation and translation will be explained later.

IV. TWO-LOOP STACK COMBINATIONS

Some examples of two-loop stacks are shown in Table 3 and include, beyond the usual mesons, the photon and zeron as examples. The latter two are both neutral matter (0matter) stacks, as is the Pion^0 with spin 0. It is the overall net number of +matter versus –matter loops that set the overall matter, neutral matter or anti-matter designation of the stacks.

The inclusion of iso-spin values in Table 3 is to confirm that such a designation is simply a representation of whether the loop is matter (iso-spin + ½) or anti-matter (iso-spin – ½). The conservation of iso-spin across loop interactions is simply the result of both conservation of charge, but also of loop matter/anti-matter numbers. In the possible conversion, for example, of an anti-up quark and a down quark into an electron and either a neutrino or anti-neutrino, as shown in Table 4, the latter must be the anti-neutrino in order to maintain an equal number of anti-matter loops before and after the conversion. Neutrinos are considered in detail further below.

However, the simplistic equating of net number of matter/anti-matter loops for defining stack types overall is not the whole story. The number of meon twist types across the conversion need to be maintained, which limits which loops can mix together and reform in such a conversion. The two columns in Table 2 labelled Twist Type count how many of each twist type are present in each loop.

Twist type A represent a twist that generates a twisting charge sign opposite to the fundamental charge (or mass) sign of the meon being twisted. A twist type B is a twist where the generated twisting charge sign is the same as the fundamental charge (or mass) sign of the meon being twisted. Twist type B produces the larger overall meon charge fields.

In a conversion of loops, the number of twists types before and after must be the same, as must the total charges and spins, so that the matter/anti-matter content is retained.

V. MATTER TYPE MEON-PAIR CONTENT

Before looking at three-loop stack combinations, the underlying pair contributions need to be considered further. First the analysis looks at +matter, -matter and 0matter meon pair combinations within loops.

Table 2 shows not only the regular loops and their partner anti-loops, but also the isomers of those loops and their symmetries or asymmetries.

There are no isomers for the electron/positron because there is only one way to generate the maximum six same-sign q/6 charges on the six meons.

For the up quarks, there are two isomers where one pair, counting a pair starting at meon 1 position, is an 0matter pair, each meon having an opposite $q/6$ charge, totalling zero for the pair. So although the loop is overall +matter, it is composed of two +matter pairs and one 0matter pair.

Which pair is which depends on where the pair definitions begin in the loop because starting from the meon position 2, it is the second of the pairs in the up quark that is 0matter instead of the third pair when counting from meon position 1. The table shows the only possible mixes of +matter, -matter and 0matter pairs that make up each loop.

There are similarly two isomers for the anti-up quarks. Note that the positron has three +matter pairs and the up quark two + matter pairs, corresponding to relative charge sizes. This becomes more complicated with the anti-down quark and neutrino.

The anti-down quark has six isomers, four of which are threefold asymmetric, like the up quarks, and two which are twofold symmetric. These symmetry types are the asymmetries that require balancing along a stack in order to produce a stable stack – along with total stack charges of integer or zero electron charge – and are more usually considered to be the result of colour forces.

Table 2 could have included as loop identity subscripts X+, Y+, X- and Y- colours for twofold symmetric loops, and R+, G+ Y+, R-, G-, Y- colours for threefold asymmetric loops. This would have enabled Tables 3, 4, 5 and 6 to show that in each stack type each loop could be given the appropriate colour or anti-colour to produce an overall W or colourless stack but this should just be taken as covered for simplicity.

Since stacks generally are being considered, only threefold asymmetric loops are included in the analysis. Twofold symmetric loops may form two-loop stacks, but only as loop and anti-loop.

For the anti-down quark loops, there are only two different pair combinations of three pairs possible. These are 1 +matter pair with 2 0matter pairs or 2 +matter pairs with 1 –matter pair. Once again, defining which pair is which depends on where pair counting begins in a loop.

Neutrinos also have six isomers, as do anti-neutrinos. But telling which is which is very difficult. The perfect definition applies to ν_5^+ and ν_6^+, where these loops are completely symmetric. But ν_5^+ and ν_5^- are exactly the same, only rotated by one meon position, or 60^o of rotation. The same is the case for ν_6^+ and ν_6^-.

The other neutrino/anti-neutrino loops require either 180^o rotation (ν_1^+, ν_1^- and ν_2^+, ν_2^-) or are not rotatable within 360^o rotation (ν_3^+, ν_3^- and ν_4^+, ν_4^-). However, these four have only twofold symmetry and so will not be found in three-loop stacks, only in two-loop, loop and anti-loop, combinations.

The two threefold symmetric neutrinos have only one possible pair combination of 3 0matter loops. These are both threefold and completely symmetric, the same as the positron, and so can exist in three-loop stacks as well as singly or combined.

This means that neutrinos/anti-neutrinos that are symmetric enough to exist in threefold symmetric quark stacks are only made from 0matter pairs. These are able to contribute loop spin and matter/anti-matter sign to the stack as needed to give it overall the appropriate spin and matter attributes.

Despite having no overall charge, the neutrinos are +matter and the anti-neutrinos -matter, because their meons' charges and masses plus loop rotation provide properties that interact with the meons in the other loops in a stack and with the background. This may appear odd, but can be clearly seen in their treatment in this way in Tables 5 and 6. The only 0matter stacks are the 2-loop stacks that combine loop and anti-loop, or higher even number loop stacks (bosons), made from colour and anti-colour loops only.

VI. TWIST ANALYSIS

In considering the twist types in conversions between loops, it should be noted that loops and anti-loops have the same numbers of A and B twists.

The twist analysis is based on how a neutron becomes a proton through conversion of, for example, two loops into two different loops, as currently defined as the weak force. The simple case of a udu quark stack core with an electron and anti-neutrino $e\nu$ two-loop stack (a leptonic Pion$^-$ (S-1)) attached, being overall together a 'long' neutron as shown in Table 5, which ejects the two-loop stack after external impact, leaving only the udu quark stack as a proton, is ignored.

Using the definitions in Table 2, the combinations can be grouped by number of loops in the conversion. Brackets indicate – (number of A twist type, number of B twist type) - and neutrino and anti-neutrino have the same A, B type.

Table 4 shows the process, using an incoming loop, and pre-existing loops in a stack which take part in the conversion, with the arrows representing the direction of the conversion into the output loops. Although the arrows point in two directions, it is likely that there will be a preferred direction of conversion. In each case it is either the electron/positron or neutrino/anti-neutrino that is the incoming loop.

Note that not all the loops in a stack are shown. Those loops that do not take part in the conversion process are omitted.

VII. THREE-LOOP STACK COMBINATIONS

There are 56 different stack combinations of three loops and their anti-loops where each can be used multiple times. Of the baryon stacks with charges of ±1 or zero electron charge, there are 10 stacks of total spin +3/2 with 10 of total spin -3/2 and 8 stacks with net spin + ½ and 8 with net spin – ½, each with the same number produced using their anti-loops. There are 2 stacks with ±2 electron charge and spin ±3/2. The remaining 36 stacks have non-integer charges and so will not be stable in our integer, or zero, electron charge environment. There are 6 stacks each with ±1 or zero electron charge, regardless of spin, totalling 18.

Interestingly, there are three stacks that appear not to be named, but should exist. These are the spin ± ½ versions of the extreme stacks made from uuu, ddd and sss quarks, which are smaller spin versions of the Delta^{++}, Delta^{-} and Omega^{-} respectively. The later flow analysis may explain why they appear either not to exist or not to have yet been observed.

The neutral charge stacks such as the neutron^{0} and Xi^{0} are anti-matter. This means that a nuclear core which has equal numbers of protons (+matter) and neutrons (-matter) is 0matter overall – a neutral matter core with a positive charge. This core can then gain overall charge neutrality by having sufficient orbiting –q charge electrons in a stable orbit, to form a stable neutral atom.

Table 4 provides examples, by considering twist types, of how loops, either in stacks, or due to impacts on those stacks, can convert between loop types.

All these combinations require loop spins, charges and twist to be the same before and after. There may be constraints on the conversion of a matter/anti-matter quark loop into a different matter/anti-matter quark loop, but these are not evident in the twist constraints.

There are equal numbers of ν_5^+ and ν_6^+ neutrinos (or anti-neutrinos) across the total combinations. This is to be expected for the complete symmetry of matter and anti-matter so far.

However, there are small asymmetries in the loops that could be what underlies the resultant stack properties, in terms of translational motion and why some stacks are preferentially formed, beyond colour symmetry and meon charge/mass interactions.

VIII. LOOP CHARGE SUCKING

When considering the twisting orientations of meons as they rotate within a loop, the relative size of the fields generated by each meon and its direction of twist relative to the centre of the loop provide a potential small difference in action.

For a positive meon twisting clockwise in a clockwise rotating (when viewed from below) loop (defined to be spin + ½) and generating the maximum charge + (Q+q/6), as is the case for the meon in the positron at position 1 in Table 2, it can be considered within the loop to be rubbing the background upwards, attracting (sucking) negative charge preferentially to flow in that direction, up from below.

For the three positive meons in the positron loop, they each have that slightly larger charge field when compared with the three negative meons which are twisting in the opposite direction to each generate –(Q-q/6) charge. So the slight preference for a spin + ½ positron is to suck negative charges through the centre of the loop from below to above its plane of rotation. If the loop is flipped over, the effect is the same, but reversed, so that the spin – ½ positron loop now sucks negative charge from above to below the plane of loop rotation. These definitions do not yet consider directions of translation for the loops.

It is easier to understand the slight preference of charge flow if set in a diagrammatic form. The spin + ½ positron sucking negative from below, into the loop, can be to some extent visualised as the construct $e^+ \rightarrow^{-}_{\cap}$, meaning 'spin + ½ positron sucking negative charge from below to above'. The flipped positron would be $e^+ \leftarrow^{\cup}_{-}$, meaning 'spin – ½ positron sucking negative charge from above to below.

For the negative charge spin + ½ electron, the situation is the mirror image, meaning sucking positive charge from below, represented by $e^- \rightarrow^{+}_{\cap}$ with the spin – ½ electron then being $e^- \leftarrow^{\cup}_{+}$. Note that it is the opposite sign of charge flow, between loop overall charge and background charge, in each case that is considered.

In order to compare background charge flows, it is necessary to translate these flows into the same flow charge sign. Since our positive matter loops have been defined to be positive charge, so that their stacks are mainly positive charge, it will be preferable for the comparison to consider the flow charge sign as negative. This means that for the spin + ½ electron the sucking of positive charge from below would instead be considered as the sucking of negative charge from above and so the representation would now be $e^- \rightarrow^{\cup}_{-}$ and the spin – ½ electron would now be $e^- \leftarrow^{-}_{\cap}$.

For the other charged loops, the flows will be the same for each sign of loop charge, although lower in effect because there are fewer net charges at work producing the charge flows.

For neutrinos, having equal size twist energies for all completely symmetric meons, there will be no flow preference when isolated. However, there may be a difference between the ν_5^+ and ν_6^+ neutrinos/anti-neutrinos since the former has all its charge fields larger than the latter. A neutrino stacked with another loop is distorted by it and the neutrino is presumed then takes its preferred flow value appropriate for its matter/anti-matter type.

It is now possible to look at loop stacks from a flow of charge perspective, which is done in Table 5. This table also includes explicitly the spin directions and flows, but the short representations are useful visual shortcuts.

The overall conclusion is that those stacks where there is a balanced zero flow move fast, since they are not affected by flows internally, whereas those with flows are slow moving. This is probably because the background affects those stacks where it can flow, reducing their ability to ignore background charge gradients, or alternatively that those stacks with preferred flows affect the background by producing charge gradients where there would otherwise be none.

Included within the list of loop stacks in Table 5 are the possible leptonic pion$^-$ (S-1), composed of an electron loop and anti-neutrino loop, and the resulting neutron^0 (S- ½) 5-loop stack when the leptonic pion$^-$ is attached to the proton$^+$ (S+ ½) 3-loop stack.

IX. LOOP HANDEDNESS DEFINITIONS

It is now possible to consider the effect, if any, of translating the loops and to compare the result to the more usual handedness definitions of the Standard Model ‘regular’ particles as Left-Handed (LH) for particle spin with respect to translational direction.

Since any loop can be flipped from spin + ½ to spin – ½ , it does not initially appear to make sense to define any screw motion to a rotating loop that also translates along its axis of rotation, but consideration could be made to understanding why some loops are considered LH or RH.

Table 6 shows the results of the flows for the same mesons and baryons previously considered. The proposal might be that the preferred direction of travel for a loop is in the direction of the plane which is sucking the opposite charge, which leads to the conclusion that all loops should travel with a left-hand screw motion. However, this assumes a neutral local background environment where both charge signs have equal fields or presence.

This may be the point of symmetry breaking from the absolute symmetry of the pre-fermion hypothesis so far, in that if in our local charge environment there is only one preferred flow charge sign, then two different handednesses will be possible, being LH and RH. This means that instead, asymmetrically, the proposal would be that regardless of the charge sign of a loop, it prefers to travel in the direction of the plane which is sucking the negative charge. An opposite local charge environment would have the opposite effect, preferring to suck positive charge which would be an overall return to symmetry, although not at the charge flow level for individual loops or loop stacks.

As a result, on the basis of the asymmetric proposal, in our environment positive charge loops with spin + ½ (+matter) travelling in their preferred direction will have a left-handed screw along their direction of travel. Negative charged loops with spin - ½ (-matter) travelling in their preferred direction will have a right-handed screw along their direction of travel.

This is exactly what would be expected if the general definition of ‘regular’ particles were of positive charged loops that are positive matter and negative charged loops anti-matter and that they each had a preferred handedness – as currently considered (but for the wrong ‘regular’ particles).

Table 6 shows the effect of this choice of definition, and means that most stacks have a preferred direction of travel overall, other than those 2-loop stacks where the flows oppose and balance to zero. In the latter cases, the direction of travel will make one loop LH and one loop RH no matter in which direction they travel. This confirms that a preference for direction of travel in an isolated loop does not preclude it travelling in the opposite direction with other handedness when in a stack of loops and that it is not possible to define any handedness permanently for a loop.

The asymmetry of local environments is likely because of the overall symmetry of charge in the universe. That there are no observable boundaries between regions of each opposite charge sign-dominant environments may be because there is no annihilation of matter and anti-matter particles on meeting and that each environment is already a mix of the two in its loop components. Any boundary effect will be much smaller than might otherwise currently be expected.

X. CONCLUSION

No further consideration need be made on why there is an apparent asymmetry between matter and anti-matter. There is no asymmetry. Anti-matter loops coexist within our loop stacks – the mesons, bosons and baryons – as well as anti-matter meon pairs within the fermion loops themselves.

The definitions, and understanding, of what is matter, anti-matter and neutral matter and how they interact and coexist need to be reinterpreted in the light of this analysis.

The pre-fermion hypothesis covered by this, and other papers, enables almost all of the main features of our universe to be explained and deserves to be more widely considered.

XI. REFERENCES

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Table 1 - The foundations of matter and anti-matter definitions

Particle	Mass M	Charge Q	Twist	Pair Spin	Vibration	Translation	Mass type
Zero mass black hole							
Positive meon	+1	+1	0	No	No	No	Matter
Negative meon	-1	-1	0	No	No	No	Anti-matter
Total	0	0	0	No	No	No	0matter

Particle	Mass M	Charge Q	Twist	Pair Spin	Vibration	Translation	Mass type
Merged Pair							
Positive meon	+1	+1	0	Yes	Yes	Yes	Matter
Negative meon	-1	-1	0	Yes	Yes	Yes	Anti-matter
Total	0	0	0	Yes	Yes	Yes	0matter

Particle	Mass M	Charge Q	Twist	Pair Spin	Vibration	Translation	Mass type
Unmerged Pair							
Positive meon	$+(1\pm s/6)$	$+(1\mp q/6)$	Yes	No	No	Yes	Matter
Negative meon	$-(1\pm s/6)$	$-(1\mp q/6)$	Yes	No	No	Yes	Anti-matter
Total (original)	0	0	Yes	No	No	Yes	0matter

Particle	Mass M	Charge Q	Twist	Pair Spin	Vibration	Translation	Mass type
Unmerged Pair							
Positive meon	$+(1+s/6)$	$+(1-q/6)$	Yes	No	No	Yes	Matter
Negative meon	$-(1-s/6)$	$-(1+q/6)$	Yes	No	No	Yes	Anti-matter
Total (--)	$+s/3$	$-q/3$	Yes	No	No	Yes	-matter

Particle	Mass M	Charge Q	Twist	Pair Spin	Vibration	Translation	Mass type
Unmerged Pair							
Positive meon	$+(1-s/6)$	$+(1+q/6)$	Yes	No	No	Yes	Matter
Negative meon	$-(1+s/6)$	$-(1-q/6)$	Yes	No	No	Yes	Anti-matter
Total (++)	$-s/3$	$+q/3$	Yes	No	No	Yes	+matter

Notes

1 $|s|=|q|=\sqrt{\propto/2\pi}$

2 $+(M-s/6)$ and $+(Q+q/6)$ is clockwise twist Type B — Mass and q/6 the same sign = clockwise Type B

$-(M-s/6)$ and $-(Q+q/6)$ is clockwise twist Type B

$+(M+s/6)$ and $+(Q-q/6)$ is anticlockwise twist Type A — Mass and q/6 opposite sign = anticlockwise Type A

$-(M+s/6)$ and $-(Q-q/6)$ is anticlockwise twist Type A

Table 2 -Three-pair loops of unmerged meons identified by fundamental charge and twist positions - showing resulting asymmetries, iso-spins and matter types

Loop Identity	Meon positions ($\pm M^{\pm q/6}$)						Twist type		Asymmetries		Pair Matter type 1			Pair Matter type 2			Overall Matter-Type	Charge *q*	Iso-spin *h*	Loop spin *h*
	1	2	3	4	5	6	A	B	Main	2nd	1	2	3	1	2	3				
e^+	$+^+$	$-^+$	$+^+$	$-^+$	$+^+$	$-^+$	3	3	3	All	+	+	+				Matter	+ 1	+ ½	+ ½ >>
e^-	$-^-$	$+^-$	$-^-$	$+^-$	$-^-$	$+^-$	3	3	3		-	-	-				Anti-matter	- 1	- ½	+ ½ >>
u_x^+	$+^+$	$-^+$	$+^+$	$-^+$	$+^-$	$-^+$	4	2	3		+	+	0	+	0	+	Matter	+ 2/3	+ ½	+ ½ >>
u_y^+	$+^+$	$-^+$	$+^+$	$-^+$	$+^+$	$-^-$	2	4	3		+	+	0				Matter	+ 2/3	+ ½	+ ½ >>
u_x^-	$-^-$	$+^-$	$-^-$	$+^-$	$-^+$	$+^-$	4	2	3		-	-	0	-	0	-	Anti-matter	- 2/3	- ½	+ ½ >>
u_y^-	$-^-$	$+^-$	$-^-$	$+^-$	$-^-$	$+^+$	2	4	3		-	-	0				Anti-matter	-2/3	- ½	+ ½ >>
d_x^+	$+^+$	$-^+$	$+^+$	$-^+$	$+^-$	$-^-$	3	3	3		+	+	-	+	0	0	Matter	+ 1/3	+ ½	+ ½ >>
d_y^+	$+^-$	$-^+$	$+^+$	$-^+$	$+^+$	$-^-$	3	3	3		0	+	0	+	+	-	Matter	+ 1/3	+ ½	+ ½ >>
d_z^+	$+^+$	$-^+$	$+^+$	$-^-$	$+^+$	$-^-$	1	5	3		+	0	0				Matter	+ 1/3	+ ½	+ ½ >>
d_w^+	$+^+$	$-^+$	$+^-$	$-^+$	$+^-$	$-^+$	5	1	3		+	0	0	0	0	+	Matter	+ 1/3	+ ½	+ ½ >>
d_s^+	$+^+$	$-^+$	$+^-$	$-^+$	$+^+$	$-^-$	3	3	2		+	0	0	0	+	0	Matter	+ 1/3	+ ½	+ ½ >>
d_t^+	$+^-$	$-^+$	$+^+$	$-^-$	$+^+$	$-^+$	3	3	2		0	0	+	+	0	0	Matter	+ 1/3	+ ½	+ ½ >>
d_x^-	$-^-$	$+^-$	$-^-$	$+^-$	$-^+$	$+^+$	3	3	3		-	-	+	-	0	0	Anti-matter	- 1/3	- ½	+ ½ >>
d_y^-	$-^+$	$+^-$	$-^-$	$+^-$	$-^-$	$+^+$	3	3	3		0	-	0	-	-	+	Anti-matter	- 1/3	- ½	+ ½ >>
d_z^-	$-^-$	$+^-$	$-^-$	$+^+$	$-^-$	$+^+$	1	5	3		-	0	0				Anti-matter	- 1/3	- ½	+ ½ >>
d_w^-	$-^-$	$+^-$	$-^+$	$+^-$	$-^+$	$+^-$	5	1	3		-	0	0	0	0	-	Anti-matter	- 1/3	- ½	+ ½ >>
d_s^-	$-^-$	$+^-$	$-^+$	$+^-$	$-^-$	$+^+$	3	3	3		-	0	0	0	-	0	Anti-matter	- 1/3	- ½	+ ½ >>
d_t^-	$-^+$	$+^-$	$-^-$	$+^+$	$-^-$	$+^-$	3	3	3		0	0	-	-	0	0	Anti-matter	- 1/3	- ½	+ ½ >>
ν_1^+	$+^+$	$-^+$	$+^+$	$-^-$	$+^-$	$-^-$	2	4	2		+	0	-	+	-	0	Matter	0	+ ½	+ ½ >>
ν_2^+	$+^-$	$-^-$	$+^-$	$-^+$	$+^+$	$-^+$	4	2	2		-	0	+	-	+	0	Matter	0	+ ½	+ ½ >>
ν_3^+	$+^+$	$-^+$	$+^-$	$-^+$	$+^-$	$-^-$	4	2	2		+	0	-	0	0	0	Matter	0	+ ½	+ ½ >>
ν_4^+	$+^-$	$-^-$	$+^+$	$-^-$	$+^+$	$-^+$	2	4	2		-	0	+	0	0	0	Matter	0	+ ½	+ ½ >>
ν_5^+	$+^+$	$-^-$	$+^+$	$-^-$	$+^+$	$-^-$	0	6	3		0	0	0				Matter	0	+ ½	+ ½ >>
ν_6^+	$+^-$	$-^+$	$+^-$	$-^+$	$+^-$	$-^+$	6	0	3		0	0	0				Matter	0	+ ½	+ ½ >>
ν_1^-	$-^-$	$+^-$	$-^-$	$+^+$	$-^+$	$+^+$	2	4	2		-	0	+	-	+	0	Anti-matter	0	- ½	+ ½ >>
ν_2^-	$-^+$	$+^+$	$-^+$	$+^-$	$-^-$	$+^-$	4	2	2		+	0	-	+	-	0	Anti-matter	0	- ½	+ ½ >>
ν_3^-	$-^-$	$+^-$	$-^+$	$+^-$	$-^+$	$+^+$	4	2	2		-	0	+	0	0	0	Anti-matter	0	- ½	+ ½ >>
ν_4^-	$-^+$	$+^+$	$-^-$	$+^+$	$-^-$	$+^-$	2	4	2		+	0	-	0	0	0	Anti-matter	0	- ½	+ ½ >>
ν_5^-	$-^-$	$+^+$	$-^-$	$+^+$	$-^-$	$+^+$	0	6	3		0	0	0				Anti-matter	0	- ½	+ ½ >>
ν_6^-	$-^+$	$+^-$	$-^+$	$+^-$	$-^+$	$+^-$	6	0	3		0	0	0				Anti-matter	0	- ½	+ ½ >>

Table 3 – Meson and Baryon loop stacks

A Some meson/double loop combinations using only Up, Down and Strange quark loops plus electrons and neutrinos

Pion^{+} (S+0)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
d_x^+	+ 1/3	- ½	+ ½	+matter					
					+ 1	0	+ 1	+matter	Pion^{+}

Pion^{+} (S+1)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
d_x^+	+ 1/3	+ ½	+ ½	+matter					
					+ 1	+1	+ 1	+matter	Pion^{+}

Pion^{0} (S+0)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
u_x^-	- 2/3	-½	- ½	-matter					
					0	0	0	0matter	Pion^{0}

Zeron^{0} (S+0)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
e^+	+ 1	+ ½	+ ½	+matter					
e^-	- 1	-½	- ½	-matter					
					0	0	0	0matter	Zeron^{0}

Zeron^0 (S+0)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
v^+	0	+ ½	+ ½	+matter					
v^-	0	-½	- ½	-matter					
					0	0	0	0matter	Zeron^0

Photon^0 (S+1)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
e^+	+ 1	+ ½	+ ½	+matter					
e^-	- 1	+½	- ½	-matter					
					0	+ 1	0	0matter	Photon^0

Photon^0 (S+1)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
v^+	0	+ ½	+ ½	+matter					
v^-	0	+½	- ½	-matter					
					0	+ 1	0	0matter	Photon^0

K$^+$ (S+0)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
s_x^+	+ 1/3	- ½	+ ½	+matter					
					+ 1	0	+ 1	+matter	K$^+$

K^{+*} (S+1)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
s_x^+	+ 1/3	+ ½	+ ½	+matter					
					+ 1	+ 1	+ 1	+matter	K^{+*}

Rho^+ (S+1)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
d_x^+	+ 1/3	+ ½	+ ½	+matter					
					+ 1	+ 1	+ 1	+matter	Rho^+

Rho^0 (S+1)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
u_x^-	- 2/3	+ ½	- ½	-matter					
					0	+ 1	0	0matter	Rho^0

B Some baryon/triple loop combinations using only Up, Down and Strange quark loops and electrons and neutrinos

$Proton^+$ (S +½)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
d_x^-	-1/3	- ½	- ½	-matter					
u_x^+	+ 2/3	+ ½	+ ½	+matter					
					+1	+ ½	+ ½	+matter	$Proton^+$

Neutron^0 (S -½)

Loop Identity	Charge *q*	Loop spin *h*	Iso-spin *h*	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
d_x^-	-1/3	- ½	- ½	-matter					
u_x^+	+ 2/3	+ ½	+ ½	+matter					
d_x^-	-1/3	- ½	- ½	-matter					
					+0	- ½	- ½	-matter	Neutron^0

Sigma^0 (S -½)

Loop Identity	Charge *q*	Loop spin *h*	Iso-spin *h*	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
d_x^-	-1/3	- ½	- ½	-matter					
u_x^+	+ 2/3	+ ½	+ ½	+matter					
s_x^-	-1/3	- ½	- ½	-matter					
					+0	- ½	- ½	-matter	Sigma^0

Sigma$^+$ (S +½)

Loop Identity	Charge *q*	Loop spin *h*	Iso-spin *h*	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
s_x^-	-1/3	- ½	- ½	-matter					
u_x^+	+ 2/3	+ ½	+ ½	+matter					
					+1	+ ½	+ ½	+matter	Sigma$^+$

Xi^0 (S -½)

Loop Identity	Charge *q*	Loop spin *h*	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
s_x^-	-1/3	- ½	- ½	-matter					
u_x^+	+ 2/3	+ ½	+ ½	+matter					
s_x^-	-1/3	- ½	- ½	-matter					
					+0	- ½	- ½	-matter	Xi^0

Sigma^{*-} (S -½)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
d_x^-	-1/3	- ½	- ½	-matter					
d_x^-	-1/3	- ½	- ½	-matter					
s_x^-	-1/3	- ½	- ½	-matter					
					- 1	- 3/2	- 3/2	-matter	Sigma^{*-}

Delta^{++} (S +3/2)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
u_x^+	+ 2/3	+ ½	+ ½	+matter					
u_x^+	+ 2/3	+ ½	+ ½	+matter					
					+2	+ 3/2	+ 3/2	+matter	Delta^{++}

Missing Delta^{++} (S +1/2)

Loop Identity	Charge q	Loop spin h	Iso-spin h	Matter Type	Total Charge	Total h loop spin	Total Iso-spin	Overall Matter type	Overall Name
u_x^+	+ 2/3	+ ½	+ ½	+matter					
u_x^+	+ 2/3	-½	+ ½	+matter					
u_x^+	+ 2/3	+ ½	+ ½	+matter					
					+2	+ ½	+ 3/2	+matter	Delta^{++}

Table 4 – Some loop conversions within loop stacks.

Some 2-loop conversions - Loops not taking part in the conversion are not listed.																						
d_z^-	(1,5)	+	ν_6^+	(6,0)	<>	u_x^+	(4,2)	+	e^-	(3,3)												
d_w^-	(5,1)	+	ν_5^+	(0,6)	<>	u_y^+	(2,4)	+	e^-	(3,3)												
u_y^+	(2,4)	+	d_z^+	(1,5)	<>	ν_5^+	(0,6)	+	e^+	(3,3)												
u_y^-	(2,4)	+	d_z^-	(1,5)	<>	ν_5^-	(0,6)	+	e^-	(3,3)												

Some 3-loop conversions - Loops not taking part in the conversion are not listed.																					
$d_{(x,y)}^-$	(3,3)	+	d_w^-	(5,1)	+	ν_5^+	(0,6)	<>	u_x^+	(4,2)	+	d_z^-	(1,5)	+	e^-	(3,3)					
$d_{(x,y)}^-$	(3,3)	+	d_z^-	(1,5)	+	ν_6^+	(6,0)	<>	u_x^+	(4,2)	+	d_y^-	(3,3)	+	e^-	(3,3)					
d_y^-	(3,3)	+	d_z^-	(1,5)	+	ν_6^+	(6,0)	<>	u_x^+	(4,2)	+	d_x^-	(3,3)	+	e^-	(3,3)					
d_w^-	(5,1)	+	d_w^-	(5,1)	+	ν_5^+	(0,6)	<>	u_x^+	(4,2)	+	$d_{(x,y)}^-$	(3,3)	+	e^-	(3,3)					
d_z^-	(1,5)	+	d_z^-	(1,5)	+	ν_6^+	(6,0)	<>	u_y^+	(2,4)	+	$d_{(x,y)}^-$	(3,3)	+	e^-	(3,3)					
d_y^-	(3,3)	+	d_z^-	(1,5)	+	ν_6^+	(6,0)	<>	u_y^+	(2,4)	+	d_w^-	(5,1)	+	e^-	(3,3)					
d_x^-	(3,3)	+	d_x^-	(3,3)	+	ν_6^+	(6,0)	<>	u_x^+	(4,2)	+	d_w^-	(5,1)	+	e^-	(3,3)					
d_y^-	(3,3)	+	d_y^-	(3,3)	+	ν_6^+	(6,0)	<>	u_x^+	(4,2)	+	d_w^-	(5,1)	+	e^-	(3,3)					
d_w^-	(5,1)	+	d_z^-	(1,5)	+	ν_6^+	(6,0)	<>	u_x^+	(4,2)	+	d_w^-	(5,1)	+	e^-	(3,3)					
d_x^-	(3,3)	+	d_w^-	(5,1)	+	ν_5^+	(0,6)	<>	u_y^+	(2,4)	+	d_y^-	(3,3)	+	e^-	(3,3)					
d_x^-	(3,3)	+	d_x^-	(3,3)	+	ν_5^+	(0,6)	<>	u_y^+	(2,4)	+	d_z^-	(1,5)	+	e^-	(3,3)					
d_x^-	(3,3)	+	d_y^-	(3,3)	+	ν_5^+	(0,6)	<>	u_y^+	(2,4)	+	d_z^-	(1,5)	+	e^-	(3,3)					
d_y^-	(3,3)	+	d_y^-	(3,3)	+	ν_5^+	(0,6)	<>	u_y^+	(2,4)	+	d_z^-	(1,5)	+	e^-	(3,3)					
d_y^-	(3,3)	+	d_y^-	(3,3)	+	ν_5^+	(0,6)	<>	u_y^+	(2,4)	+	d_z^-	(1,5)	+	e^-	(3,3)					

Some 4-loop conversions																						
u_x^+	(4,2)	+	u_x^+	(4,2)	+	d_z^-	(1,5)	+	e^-	(3,3)	<>	u_y^+	(2,4)	+	d_w^-	(5,1)	+	d_w^-	(5,1)	+	ν_5^+	(0,6)
u_x^+	(4,2)	+	u_x^+	(4,2)	+	d_x^-	(3,3)	+	e^-	(3,3)	<>	u_y^+	(2,4)	+	d_y^-	(3,3)	+	d_y^-	(3,3)	+	ν_6^+	(6,0)
u_x^+	(2,4)	+	u_y^+	(2,4)	+	d_x^-	(3,3)	+	e^-	(3,3)	<>	u_x^+	(4,2)	+	d_y^-	(3,3)	+	d_y^-	(3,3)	+	ν_5^+	(0,6)
u_x^+	(2,4)	+	u_y^+	(2,4)	+	d_x^-	(3,3)	+	ν_6^-	(6,0)	<>	u_x^+	(4,2)	+	d_y^-	(3,3)	+	d_y^-	(3,3)	+	e^+	(3,3)

Table 5 - Charge flow analysis for some mesons and baryons

A Some meson/double loop combinations using only Up, Down and Strange quark loops and electrons and neutrinos

Pion^{+} (S+0)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
d_x^+	+ 1/3	- ½	$d^+ \leftarrow_{-}^{\cup}$	+matter					
			Opposed		+ 1	0	None	+matter	Fast

Pion^{0} (S+0)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
u_x^-	- 2/3	-½	$u^- \leftarrow_{\cap}^{-}$	-matter					
			Flow		0	0	Flow	0matter	Slow

Pion^{+} (S+1)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
d_x^+	+ 1/3	+ ½	$d^+ \rightarrow_{\cap}^{-}$	+matter					
			Flow		+ 1	+ 1	Flow	+matter	Slow

Zeron^{0} (S+0)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
e^+	+ 1	+ ½	$e^+ \rightarrow_{\cap}^{-}$	+matter					
e^-	- 1	-½	$e^- \leftarrow_{\cap}^{-}$	-matter					
			Flow		0	0	Flow	0matter	Slow

Photon[0] (S+1)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
e^+	+ 1	+ ½	$e^+ \to_{\cap}^{-}$	+matter					
e^-	- 1	+½	$e^- \to_{-}^{\cup}$	-matter					
			Opposed		0	+ 1	None	0matter	Fast

K^+ (S+0)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \to_{\cap}^{-}$	+matter					
s_x^+	+ 1/3	- ½	$s^+ \leftarrow_{-}^{\cup}$	+matter					
			Opposed		+ 1	0	None	+matter	Fast

K^{+*} (S+1)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \to_{\cap}^{-}$	+matter					
s_x^+	+ 1/3	+ ½	$s^+ \to_{\cap}^{-}$	+matter					
			Flow		+ 1	+ 1	Flow	+matter	Slow

Rho[+] (S+1)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \to_{\cap}^{-}$	+matter					
d_x^+	+ 1/3	+ ½	$d^+ \to_{\cap}^{-}$	+matter					
			Flow		+ 1	+ 1	Flow	+matter	Slow

Rho^0 (S+1)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
u_x^-	- 2/3	+ ½	$u^- \rightarrow_{-}^{\cup}$	-matter					
			Opposed		0	+ 1	None	0matter	Fast

Leptonic Pion$^-$ (S-1)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
v^-	0	- ½	$e^- \leftarrow_{\cap}^{-}$	-matter					
e^-	- 1	-½	$e^- \leftarrow_{\cap}^{-}$	-matter					
			Flow		0	- 1	Flow	-matter	Slow

B Some baryon/triple loop combinations using only Up, Down and Strange quark loops and electrons and neutrinos

Proton$^+$ (S +½)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter					
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
			Flow		+1	+ ½	Flow	+matter	Slow

Neutron^0 (S -½)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter					
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter					
			Flow		+0	- ½	Flow	-matter	Slow

Sigma^0 (S -½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter					
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
s_x^-	-1/3	- ½	$s^- \leftarrow_{\cap}^{-}$	-matter					
			Flow		+0	- ½	Flow	-matter	Slow

Sigma$^+$ (S +½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
s_x^-	-1/3	- ½	$s^- \leftarrow_{\cap}^{-}$	-matter					
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
			Flow		+1	+ ½	Flow	+matter	Slow

Xi^0 (S -½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
s_x^-	-1/3	- ½	$s^- \leftarrow_{\cap}^{-}$	-matter					
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
s_x^-	-1/3	- ½	$s^- \leftarrow_{\cap}^{-}$	-matter					
			Flow		+0	- ½	Flow	-matter	Slow

Sigma^{*-} (S -½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter					
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter					
s_x^-	-1/3	- ½	$s^- \leftarrow_{\cap}^{-}$	-matter					
			Flow		- 1	- 3/2	Flow	-matter	Slow

Delta[++] (S +3/2)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
			Flow		+2	+ 3/2	Flow	+matter	Slow

Missing Delta[++] (S + ½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
u_x^+	+ 2/3	-½	$u^+ \leftarrow_{-}^{\cup}$	+matter					
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
			Mixed		+2	+ ½	Mixed	+matter	Slow?

C A five-loop combination

Long Neutron[0] (S- ½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Total Charge	Total h loop spin	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter					
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter					
v^-	0	- ½	$v^- \leftarrow_{\cap}^{-}$	-matter					
e^-	- 1	-½	$e^- \leftarrow_{\cap}^{-}$	-matter					
			Flow		0	- ½	Flow	-matter	Slow

Table 6 - LH and RH negative charge suck analysis

A Some meson/double loop combinations using only Up, Down and Strange quark loops and electrons and neutrinos

Pion+ (S+0)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
d_x^+	+ 1/3	- ½	$d^+ \leftarrow_{-}^{\cup}$	+matter	↑	RH			
			Opposed		↑↓	Both	None	+matter	Fast

Pion0 (S+0)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
u_x^-	- 2/3	-½	$u^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
			Flow		↓	Both	Flow	0matter	Slow

Pion+ (S+1)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
d_x^+	+ 1/3	+ ½	$d^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
			Flow		↓	LH	Flow	+matter	Slow

Zeron0 (S+0)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
e^+	+ 1	+ ½	$e^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
e^-	- 1	-½	$e^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
			Flow		↓	Both	Flow	0matter	Slow

Photon^0 (S+1)

Loop Identity	Charge q	Loop spin *h*	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
e^{+}	+ 1	+ ½	$e^{+} \rightarrow^{-}_{\cap}$	+matter	$\downarrow$	LH			
e^{-}	- 1	+½	$e^{-} \rightarrow^{\cup}_{-}$	-matter	$\uparrow$	RH			
			Opposed		$\uparrow\downarrow$	Both	None	0matter	Fast

K$^+$ (S+0)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^{+}	+ 2/3	+ ½	$u^{+} \rightarrow^{-}_{\cap}$	+matter	$\downarrow$	LH			
s_x^{+}	+ 1/3	- ½	$s^{+} \leftarrow^{\cup}_{-}$	+matter	$\uparrow$	LH			
			Opposed		$\uparrow\downarrow$	LH	None	+matter	Fast

K^{+*} (S+1)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^{+}	+ 2/3	+ ½	$u^{+} \rightarrow^{-}_{\cap}$	+matter	$\downarrow$	LH			
s_x^{+}	+ 1/3	+ ½	$s^{+} \rightarrow^{-}_{\cap}$	+matter	$\downarrow$	LH			
			Flow		$\downarrow$	LH	Flow	+matter	Slow

Rho$^+$ (S+1)

Loop Identity	Charge *q*	Loop spin *h*	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^{+}	+ 2/3	+ ½	$u^{+} \rightarrow^{-}_{\cap}$	+matter	$\downarrow$	LH			
d_x^{+}	+ 1/3	+ ½	$d^{+} \rightarrow^{-}_{\cap}$	+matter	$\downarrow$	LH			
			Flow		$\downarrow$	LH	Flow	+matter	Slow

Rho[0] (S+1)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow \overset{-}{\cap}$	+matter	↓	LH			
u_x^-	- 2/3	+ ½	$u^- \rightarrow \underset{-}{\cup}$	-matter	↑	RH			
			Opposed		↑↓	Both	None	0matter	Fast

Leptonic Pion[-] (S-1)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
v^-	0	- ½	$v^- \leftarrow \overset{-}{\cap}$	-matter	↓	RH			
e^-	- 1	-½	$e^- \leftarrow \overset{-}{\cap}$	-matter	↓	RH			
			Flow		↓	RH	Flow	-matter	Slow

B Some baryon/triple loop combinations using only Up, Down and Strange quark loops and electrons and neutrinos

Proton[+] (S +½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow \overset{-}{\cap}$	+matter	↓	LH			
d_x^-	-1/3	- ½	$d^- \leftarrow \overset{-}{\cap}$	-matter	↓	RH			
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow \overset{-}{\cap}$	+matter	↓	LH			
			Flow		↓	LH	Flow	+matter	Slow

Neutron[0] (S -½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
d_x^-	-1/3	- ½	$d^- \leftarrow \overset{-}{\cap}$	-matter	↓	RH			
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow \overset{-}{\cap}$	+matter	↓	LH			
d_x^-	-1/3	- ½	$d^- \leftarrow \overset{-}{\cap}$	-matter	↓	RH			
			Flow		↓	RH	Flow	-matter	Slow

Sigma^0 (S -½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
s_x^-	-1/3	- ½	$s^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
			Flow		↓	RH	Flow	-matter	Slow

Sigma$^+$ (S +½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
s_x^-	-1/3	- ½	$s^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
			Flow		↓	LH	Flow	+matter	Slow

Xi^0 (S -½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
s_x^-	-1/3	- ½	$s^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
s_x^-	-1/3	- ½	$s^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
			Flow		↓	RH	Flow	-matter	Slow

Sigma^{*-} (S -½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
s_x^-	-1/3	- ½	$s^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
			Flow		↓	RH	Flow	-matter	Slow

Delta^{++} (S +3/2)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
			Flow		↓	LH	Flow	+matter	Slow

Missing Delta^{++} (S + ½) - exist or not?

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
u_x^+	+ 2/3	-½	$u^+ \leftarrow_{-}^{\cup}$	+matter	↑	LH			
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
			Mixed		↑↓	LH	Mixed	+matter	Slow?

C A five-loop combination

Long Neutron^0 (S- ½)

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
d_x^-	-1/3	- ½	$d^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
u_x^+	+ 2/3	+ ½	$u^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
e^-	0	- ½	$e^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
v^-	- 1	-½	$v^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			
			Flow		↓	RH	Flow	-matter	Slow

D Isolated neutrino or anti-neutrino flow

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
v^+	0	+ ½	none	+matter	↑↓	LH or RH			
v^-	0	- ½	none	-matter	↑↓	LH or RH			

E Stacked neutrino or anti-neutrino flow

Loop Identity	Charge q	Loop spin h	Charge Flow (-)	Matter Type	Travel Direction	LH or RH	Charge Flow	Overall Matter type	Overall Speed
v^+	0	+ ½	$v^+ \rightarrow_{\cap}^{-}$	+matter	↓	LH			
v^-	0	- ½	$v^- \leftarrow_{\cap}^{-}$	-matter	↓	RH			