A Conceptual Model of the Structure of Elementary Particles, Including a Description of the Dark Matter Particle

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ABSTRACT

In the hyperverse model, particles of matter are collapsed and coalesced quanta of space, created by a condensation process to conserve angular momentum and centripetal force. We have proposed that the component quanta have spin, and hypothesize here that upon particle formation, the collapsed and coalesced component quanta are fixed in orientation so that either their north or south poles face the particle center. Six coalesced vortices produce structures that can account for all charge variations, including fractional charges and anti-particles. Fractional charges are net charges, where charge is a consequence of the spin orientations. The model suggests that protons carry a hidden negative one charge, speculated to be what stops the electron from falling into the proton. We hypothesize that "condensation neutrinos" exist, neutrinos made by the natural condensation route of particle creation, and these lack the high kinetic energy of "emission neutrinos", created as a result of atomic decay and collision. Condensation neutrinos would be the most numerous particle, but difficult to detect, and may be the dark matter particle.

Subject headings: condensation neutrinos; dark matter; emission neutrinos; fundamental particles; neutral quark; structure of elementary particles

Introduction

In [1] we advanced the idea that the universe is the three dimensional surface volume of a four dimensional, hollow hypersphere, termed the hyperverse. The hyperverse is expanding radially at twice the speed of light, its circumferential expansion matches the Hubble constant, and the surface consists of energy. In [2] we showed the energetics of the surface vortices produce relativity, and together with the 2c radial expansion, create time. In [3] we argued that the hyperverse is following a geometric mean expansion, which accounts for, among other things, the deep connection between the small and the large of the universe. We gave evidence suggesting that the expansion of the universe is intimately connected to the creation of quantum levels, one of which, termed the 'small energy quantum', or SEQ, is the quantum of our experience. The expanding hyperverse possesses spin and must conserve angular momentum, and at the SEQ level, the quanta are forced to collapse and coalesce in order to conserve angular momentum and centripetal force [4], forming elementary particles. Thus, matter is condensed space, held in place by angular momentum. Because the angular momentum of the universe is continually increasing, and the energy of the component quanta is continually shrinking, the universe must continually create new particles of matter, and all particles must continually accrete energy; this ongoing accretion of the quanta of space is gravity [4].

The main idea of this paper is that we can model all the elementary particle charge structures using a six-sided coalesced quanta assemblage.

We find:

- we can model all elementary particle charges.
- we can explain fractional charges.
- we can explain antimatter.
- the model gives only the known charge arrangements and no others.
- the proton has a full negative charge hidden within it.
- the presence of this negative one charge within the proton is probably the reason the electron does not get drawn into the proton.
- neutrinos, or neutral particles, should be created by this natural condensation process.
- these "condensation neutrinos" should be extremely common, but difficult to detect due to their low kinetic energy.
- dark matter is probably comprised of condensation neutrinos.

1. The Rationale for the Model

Hyperverse theory postulates that the universe is the surface volume of a hollow, four dimensional sphere, and that the surface is composed of energy. We model this energy as vortices, or spinning, four dimensional spheres. We will primarily consider two spin orientations, relative to the center of a particle.

Figure 1 shows the use of the right hand rule applied to the earth, with the thumb of a right hand pointing north, and the curl of the fingers pointing in the direction of spin.

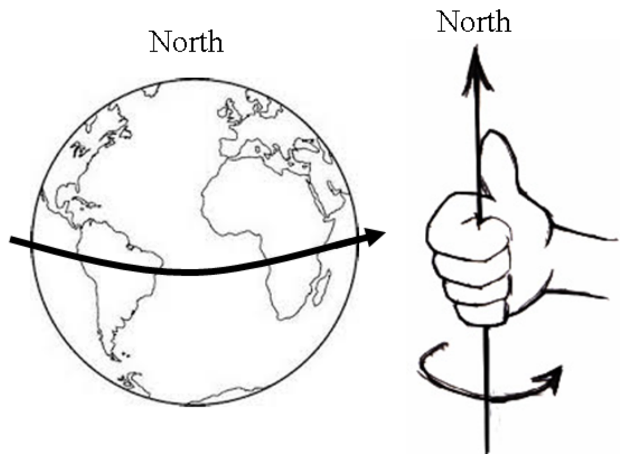


Figure 1. In our discussions, the thumb of the right hand will be defined as pointing 'north' as shown here, and the fingers point in the direction of spin.

Figure 2 shows the two spin orientations that we will discuss. The black line represents the 'point' of reference, which is defined as the center of the matter particle. In Figure 2, left, we have north facing towards the center; in the right diagram, north faces away from the center. For easy scripting of the orientations, we will use the letters 'u' and 'n'. The open end of each alphabetic symbol represents south, and the closed end is north.

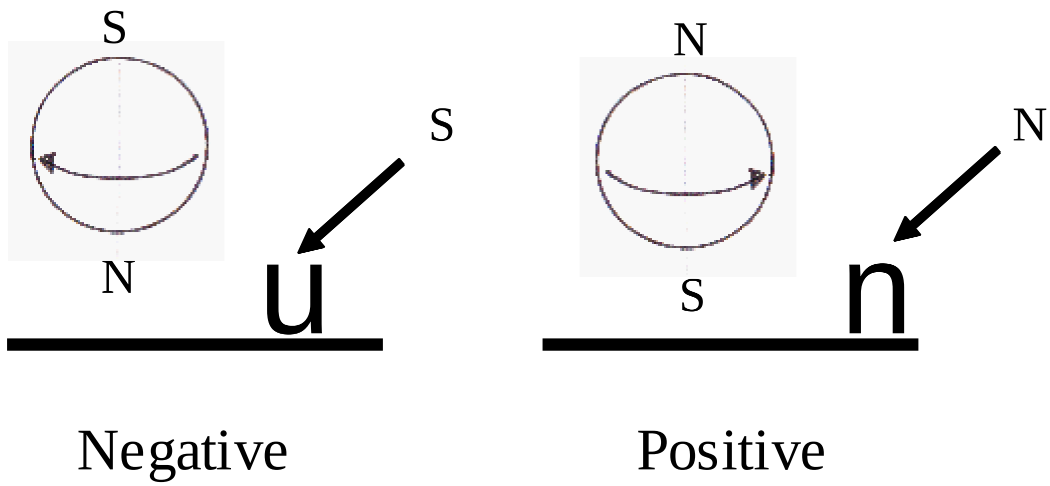


Figure 2. Using the right hand rule and orientation of spin to the black line beneath each example, the left side shows what we will define as a negative charge, and the right side is the positive charge orientation. For shorthand notation, the letter 'u' is defined as negative and the 'n' is positive.

2. Spin Orientations Determine Repulsion or Attraction

Given two particles, each bearing a vortex in identical orientation with respect to its particle's center, as in Figure 3, we see that the exposed spins offer opposite, or opposing, spins to one another and would repel upon contact.

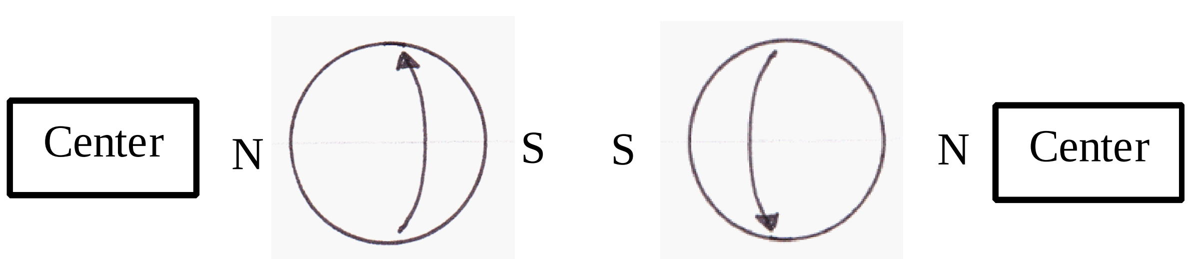


Figure 3. Repulsion will occur when the same poles face each other. The spin directions are opposite, cannot mesh, and would repel. "Center" refers to the center of the particle.

If two particles were near one another, and one had a south pole exposed, and the other a north pole exposed, the spins of the two vortices would be complementary, allowing easy union, and would be considered as electrically attractive, as shown in Figure 4.

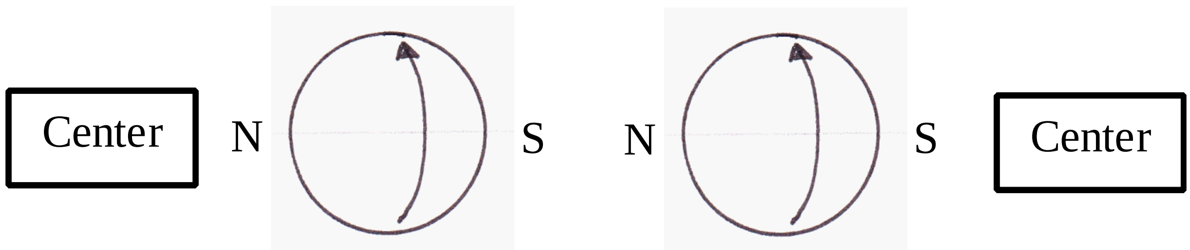


Figure 4. Attraction and binding can occur because opposite poles present complementary spin directions. The spinning atoms of space have meshing spin orientations. 'Center' refers to the center of the particle to which the vortex is part of.

3. Modeling Elementary Particles and Their Antiparticles Using Vortices

We can model the electrical charges of quarks and leptons using spinning atoms of space, building around the particle centers, using the 'n' and 'u' notation. We will use the convention that if the north pole of the atom of space faces away from the center, then it will be represented as an 'n', and is considered to be 'positive'. If the south pole is oriented away from the center, then it will be represented with a 'u' and defined as 'negative'. We will conjecture that a particle has six sides, each side bearing a vortex. There can be any combination of positive and negative vortex orientations among the six component vortices.

Figure 5 shows a two dimensional representation of the arrangement of the six vortex units around a particle center. In this case, we have an electron, as all six of the components are exposing their south poles, or negative orientations.

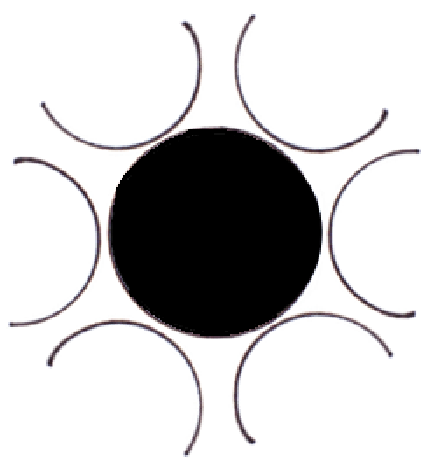


Figure 5. The electron, as per our model, consists of six quanta orientations, all with their

south poles, or negative poles, facing outwards. This drawing is a two dimensional version of what would be a three dimensional, one quantum per side arrangement. The black circle represents the center of the particle.

In Table 1, we see that using six vortex orientations around a particle center gives us seven combinations, running from six negatives (row 1) to six positives (row 7). In column three, titled 'configuration', note we have underlined the pairs of opposing orientations to make it easier to see the cancelling pairings at a glance. In column four we have assigned a charge to each particle and given the name of the particle that the vortex configuration is thought to represent. The pairings cancel out, leaving a net charge for the particle.

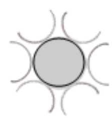
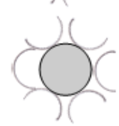
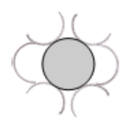
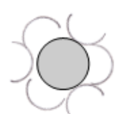
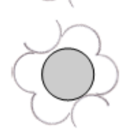
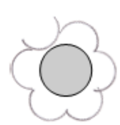
Configuration count	Image	Configuration	Net charge	Proposed particle
6u		uuuuuu	-1	electron
5u,1n		uuuuun	-2/3	anti-up quark
4u,2n		uuuunn	-1/3	down quark
3u,3n		uuunnn	0	neutrino
2u,4n		uunnnn	+1/3	anti-down quark
1u,5n		unnnnn	+2/3	up quark
6n		nnnnnn	+1	positron

Table 1. Spin orientation configurations and their associated particles. The underlined portions of the configuration column represent cancelling pairs of spin or charge.

The electron, row one, consists of six vortices, all with their south, or negative, ends exposed, as also shown in Figure 5. There is no internal cancelling, and the electric charge is defined as minus one.

If five sides of the particle had negative orientations, and just one of the six sides of the particle had a vortex oriented so that its positive side was exposed, we would have a 5u1n configuration. Two of the six sides would be opposite to one another, cancelling each other, leaving us with a net charge of minus two-thirds. We define this as the anti-up quark. The underlining should make it easy to see the canceled and non-canceled components.

The 4u2n configuration, row three, has a net charge of one-third, and this configuration represents the down quark. If one-half of the six vortices were in a positive orientation, and one-half in the negative orientation, the spins would completely cancel, and we would have a neutral charge, matching a neutrino's charge. Four positive orientations and two negative, leave us with a net positive one-third charge, as shown in row five. The up quark, row six, has one negative orientation and five positive. Finally, row seven shows that the positron is a combination of six positive orientations. We find that we can model all of the charge combinations of elementary particles with this vortex configuration system.

The system gives a simple explanation of particles and their antiparticles. For example, the electron's antiparticle is the positron, row 7, which has the reverse configuration seen in the electron. The same applies to the anti-up and up quarks, and the down and anti-down. The neutrino, row four, is its own antiparticle. We can account for all of the particle and antiparticle charge variations using this model.

As discussed in [4], matter is condensed space, and the vortices retain their vortex behavior upon their collapse and coalescence into particles. The configuration of the spin orientations of the component quanta determines the electric properties of a particle. Fractional charges are net charges.

4. Particle-Antiparticle Pairings and Annihilation

Combining a particle and its antiparticle allows binding of each quantum of one particle to a corresponding quantum on the other. For example, an electron and a positron have complementary spin pairings for all six of each particle's vortices, as shown in Figure 6. When an electron and a positron meet, they typically combine and annihilate one another. With this model, we can see that there is no opposing spin orientation to stop this attraction; the quanta can pull together without hindrance. The same complementary pairings would occur for all particles and their antiparticles.

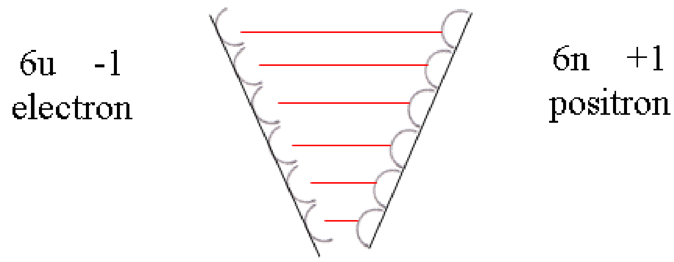


Figure 6. This diagram shows the component quanta laid out in a row for easy viewing. Each of the six quanta of the electron is matched by a complementary spin orientation of the positron. The two particles would pull together.

5. Modeling Neutrons

A neutron consists of three quarks: down, down and up. The charges are -1/3, -1/3, +2/3. Adding the three charges gives a total net charge of zero. Using our modeling system, the quark configurations are uuuunn, uuuunn, nnnnnu, or 4u2n, 4u2n and 1u5n. The total is 9u9n. The triangle diagram of Figure 7 shows a possible one-to-one binding within a neutron. The sides represent quarks and the lines between the n's and u's show possible pairings. In the neutron all component quanta are paired up, leaving no unbound electric charge. Also, no set of quarks within the neutron are fully bound, as occurs in particle-antiparticle pairings; in each pairing of quarks within the neutron, opposing quanta provide repulsion, and stop an annihilation event. This same observation applies to protons as well.

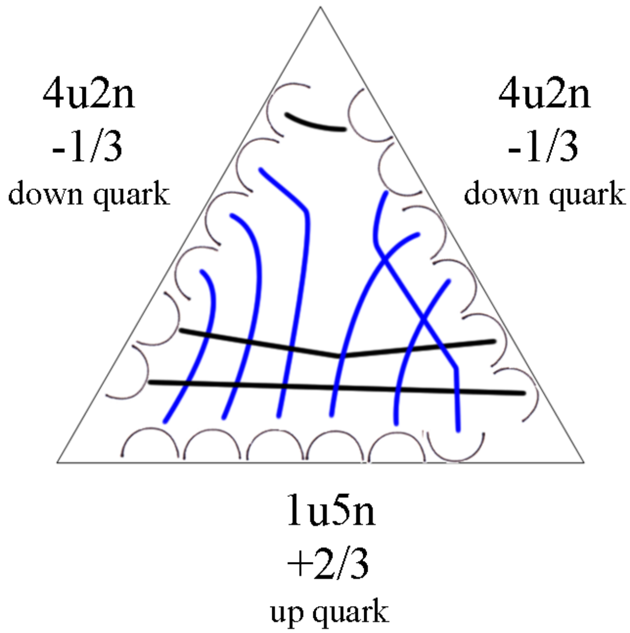


Figure 7. This triangle diagram for a neutron shows how the component quanta of the three quarks might interact. All three quarks are equally linked, and no net charge remains.

6. Modeling Protons

A proton consists of three quarks: up, up and down. The charges are +2/3, +2/3, -1/3, giving a net charge of +1. The 'nu' quark orientations are nnnnnu, nnnnnu, uuuunn, or 1u5n, 1u5n and 4u2n, for a total of 6u12n. There is a net excess of 6n, exactly what is needed to bind to the 6u of the electron.

Figure 9 shows a triangle representation. The lines show a possible binding arrangement between the component quarks. The dots highlight the six unpaired quanta, leaving a net charge of plus one.

As with the neutron, there are no pairs of quarks within the proton that can pull together and annihilate; all pairings have both repellent and attractive interactions.

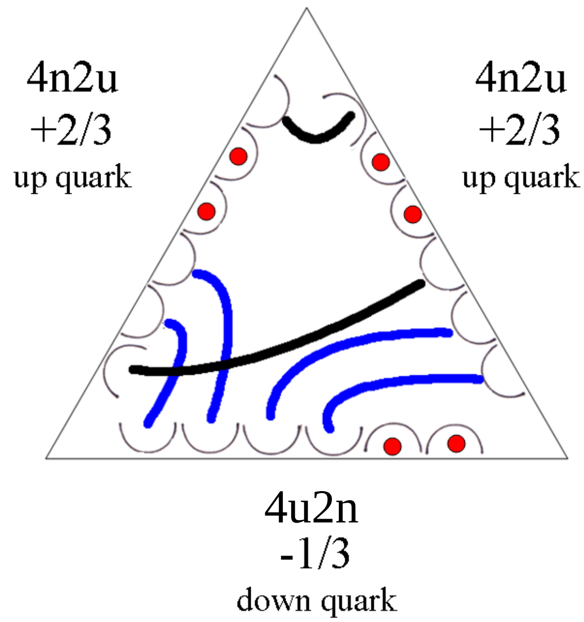


Figure 9. A triangle diagram for the proton. Each side represents a quark and the associated quantum linkages. Binding between the three quarks leaves a net of six positively oriented quanta, marked with dots, available for binding to an electron.

7. The Proton Carries Negative Charge

The proton, consisting of three quarks, has a total configuration of 6u12n, giving six free, unbound, positively oriented quanta of space, a perfect complement to the electron's six negatively exposed quanta. The electron is held to the proton by six positively oriented quanta.

But also within the proton are those six negatively oriented quanta. Here we can deduce another property for the model. If we assume the bindings between all the particles are not firm, but have a more diffuse, flux-like or mobile nature, we can use the 6u of the interior paired quanta of the proton, which help hold the three quarks together, to also serve as agents of repulsion against the electron. If the electron comes in too close to the proton, the six negatively oriented quanta will repel it and keep it away.

Thus the proton possesses both negative and positive charges. The 6u12n structure gives us six negative and twelve positive elements. Internal binding of the 6u and 6n leaves a net of six positive elements free to bind to the electron's six free negatively oriented quanta. Due to the presumed flux character of the quantum spin connections, the six negative elements are still available to repel the electron if it gets too close. The electron is pulled by twelve units and repelled by six units.

This is quite different from the standard thinking of the proton as only possessing positive charge, with no negative component. Our model provides for simultaneous attractive and repulsive charges within the proton, making it simpler to explain why the electron, although attracted to the proton, does not get pulled all the way into the nucleus. The electron cannot be pulled all the way in because of the existence of negative charge within the proton. Coexisting positive and negative charges both attract and repel the electron, and although attraction exceeds repulsion by two to one, repulsive charges are present and prevent collapse of the electron into the proton.

Standard explanations for why the electron does not fall into the proton, despite the opposite and highly attractive charges, usually revert to arguments regarding violation of the Heisenberg uncertainty principle, and are fuzzy, complicated, and not intuitive. Simultaneous attraction and repulsion makes this much easier to understand.

8. The ’Condensation’ Neutrino as the Dark Matter Particle

The theory of matter described in [4] implies the universe creates particles of matter to conserve angular momentum and centripetal force, the particles essentially condensing from space. Upon the collapse and coalescence of the quanta of space to form particles, the orientation of the quanta, relative to the particle centers, is probably, mostly, random, and thus we can presume that all particle types are created by way of the condensation route.

The condensation model implies that neutrinos are created just like any other particle, and assumably the particles created in this manner would possess little to no kinetic energy. Neutrinos, as we know them, are produced by nuclear decay, move at nearly the speed of light, and have a high kinetic energy.

Particle creation, by way of condensation, implies there is a ’condensation’ neutrino, formed by the universe, just as it creates quarks and electrons, to conserve angular momentum. Nuclear decay and collision events create what we can refer to as an ’emission’ neutrino, a high speed, high kinetic energy neutrino. Condensation neutrinos would be identical to emission neutrinos, except for their very low kinetic energy.

Thus we have two ways to create neutrinos: by emission and by condensation. This gives us a ’new’ particle, essentially a neutral quark, our condensation neutrino, which would serve very well as the dark matter particle. The condensation neutrino would be electrically neutral and therefore would rarely interact with matter. Its kinetic energy would be very low, and combined with its electrically neutral state, would make detection very difficult. Given that the condensation neutrino would be statistically the most commonly produced particle in Table 1, and, vastly more significant, that annihilation of these neutral particles would be much rarer than for the other particles, we can assume that condensation neutrinos are the most numerous of the elementary particles.

The model suggests that the condensation neutrino is the dark matter particle. It would be electrically neutral and therefore 'dark', and due to its near lack of kinetic energy, it would be held by the gravitational forces of galaxies.

I would like to thank Peter Nordstrom for assistance with the graphics.

References

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