This posting is based on my Theory of Everything explained in:
TRONNIES – THE SOURCE OF THE COOULOMB FORCE

PARTICLE SPINS ARE REAL

(02/24/2016)

SPIN ANGULAR MOMENTUM

At the atomic and sub-atomic level, all particles have a quantum spin angular momentum which is zero or some integer or half integer value of the reduced Planck constant (h-bar) which has a value of:

$$\text{h-bar} = 1.054570203 \times 10^{-34} \text{ Js or } 1.054570203 \times 10^{-34} \text{ kgm}^2/\text{s}$$

SPIN OF SUB-ATOMIC PARTICLES

Sub-Atomic Particle	**The Spin is:**
Photon	1
Electron and Positron	½+
Proton and Anti-Proton	½+
Alpha Particle	0

SPIN OF ATOMIC NUCLEI

The measured spins of all of the nuclei of stable atoms are described in the attached "ROSS MODEL - STABLE ISOTOPE CHART". Please refer to the attached 13-page **Stable Isotope Chart** and the following summary:

Zero Spin Atomic Nuclei

SPIN

There are **eleven zero spin atomic nuclei** comprised of only alpha particles and gamma ray entrons: 0

He-4, Be-8, C-12, O-16, Ne-20, Mg-24, Si-28, S-32, Cl-36 and Ar-40.

There are **111 zero spin stable atomic nuclei** comprised of only alpha particles and gamma ray entrons, plus:

1) an even number of electrons, the number is 52 nuclei,	0
2) two protons and two electrons, the number is 59 nuclei,	0
3) two protons and no electrons, the number is 5 nuclei.	0

Integer Spin Atomic Nuclei

There are **seven integer spin stable atomic nuclei**:

H-2 (0 alphas, 2 protons and 1 electron)	1+
Li-6 (1 alpha, 2 protons and 1 electron)	1+
N-14 (3 alphas, 2 protons and 1 electron)	1+
K-40 (10 alphas and 1 electron)	4-
Ta-180 (45 alphas and 1 unpaired electron)	9-
Tc-98 (24 alphas, 2 protons and 1 unpaired electron)	6+
La-138 (34 alphas 2 protons and 1 unpaired electron)	5+

Half Integer Spin Atomic Nuclei

There are **110 stable half integer spin atomic nuclei**. Spin values are: plus or minus 1/2, 3/2, 5/2, 7/2 or 9/2.

All have:

1) one proton and zero or one unpaired (U.P.) electron or
2) three protons and one or two unpaired electrons

(All have half integer spins of plus or minus 1/2, 3/2, 5/2, 7/2 or 9/2). The distribution is as follows:

Spin	One Proton One U.P. Electron	One Proton Zero U.P. Electron	Three Protons One U.P. Electron	Three Proton Two U.P. Electrons
1/2+	7	3	3	5
1/2-	2	2	4	2

3/2+	6	2	2	5
3/2-	6	0	0	8
5/2+	7	4	2	4
5/2-	1	1	2	1
7/2+	1	2	0	3
7/2-	3	1	6	2
9/2+	2	2	2	3
9/2-	0	1	0	0

TRONNIES

Everything in the Cosmos is made from tronnies or things made from tronnies. Tronnies are point particles with a charge of plus e or minus e (about 1.602×10^{-19} coulombs). (By "Cosmos" I mean everything that exists, has existed and will exist, everywhere, including our present universe, previous universes, parallel universes (if any) and future universes.) Tronnies, being point particles, have no mass, no energy and no spin. Each tronnie is a focus point of speed-of-light Coulomb force waves. Tronnies in order to exist must travel in perfect circles at a speed of π/2 times the speed of light with one or two other tronnies. An entron is a combination of two tronnies, one plus and one minus, traveling on opposite sides of a perfect circle at a speed of π/2 times the speed of light. The diameters of the entron circle can range from about 0.9339×10^{-18} m to a few centimeters. Every photon in the Cosmos is comprised of one entron. Each photon and its entron have a measured spin of 1 (i.e. h-bar = $1.054570203 \times 10^{-34}$ Js). Three tronnies make an electron (two minus and one plus) and three tronnies make a positron (two plus and one minus). Electrons and positrons have a spin of ½ h-bar each. Everything else in the Cosmos is made from entrons, electrons and positrons. For example, the naked proton is made from an electron that has captured a neutrino entron and two positrons. The naked anti-proton is made from a positron that has captured a neutrino entron and two electrons. The alpha particle is comprised of four protons, two electrons and a number of gamma ray entrons. The spins of photons, electrons, positrons, protons and anti-protons are discussed below.

SPIN ACCORDING TO ROSS MODEL

The spin of atomic nuclei, subatomic particles and certain other small particles can be measured very accurately in systems similar to that used in the famous Stern-Gerlach experiment. The problem is no one has been able to explain why these particles possess these particular spins. The following is a typical explanation from Wikipedia of the spin of sub-atomic particles:

> "Spin is often depicted as a particle literally spinning around on an axis, but this is a misleading and incorrect picture: spin is an intrinsic property of a particle, unrelated to any sort of motion in space and fundamentally different from orbital angular momentum. All elementary particles have a characteristic spin, for example electrons always have "spin ½" (this actually means spin ½ h-bar) while photons always have "spin 1" (this actually means "spin h-bar").

I plan to prove here that the spin of elementary particles is extremely real and it is equal to the angular momentum of the particle, based on the well-known formula:

$$L = rmv.$$

where: L is angular momentum, r is the moment arm, m is the mass of the particle and v is its velocity. However, my explanation requires that you the reader ignore most of what you have been taught about the Standard Model and Einstein relativity. My model is described in my recently published book, **Tronnies – The Source of the Coulomb Force**, available in print or digital at **Amazon.com**. The following is a twelve-sentence summary of my model of our Universe:

Short Summary of the Ross Model

1) "Tronnies" are point particles with no volume and no mass, but each tronnie has a charge of either plus e or minus e (i.e. a charge of about +/- 1.602 X 10^{-19} coulombs).
2) Everything in the Cosmos is made from tronnies or things made from tronnies.
3) Tronnies in order to exist must travel in perfect circles at a speed of π/2 times the speed of light (πc/2 = about 1.5708 c) with one or two other tronnies also traveling in perfect circles.
4) Two opposite tronnies make an entron which has no net charge but does have a mass; in fact entrons account for all of the mass in our Universe except for the mass of electrons and positrons.
5) Entrons are self-propelled in circles at twice the speed of light and forward at the speed of light (c) in the form of photons, with one entron making each photon.
6) Three special entrons (the 928 Mev neutrino entron, the 1.02 MeV gamma ray entron and the 1.12 KeV ultraviolet entron) combine in pair production processes to make a naked electron and a naked positron.
7) Naked electrons and naked positrons can capture one or more entrons to become energetic electrons or positrons.

8) A naked proton is comprised of two naked positrons circling the path of an electron that has captured a specific very high-energy entron (called the neutrino entron) which has a mass of about 1.65 X 10^{-27} kg.
9) Naked protons are self-propelled at a specific high speed, but capture gamma ray entrons to slow down to become a energetic protons each of which then can then capture an electron to become a hydrogen atom.
10) Hydrogen atoms combine in fusion processes in stars, releasing gamma ray entrons of the hydrogen atoms as thermal or radiant energy, to become alpha particles which in turn combine with up to 28 electrons, up to three protons and gamma ray entrons in the stars to make all of the stable heavier isotopes.
11) Atoms are broken down in Black Holes to protons electrons and positrons, and anti-protons are created, and the protons are annihilated in Black Holes in combinations with anti-protons to release electrons, positrons and two neutrino entrons which escape the Black Holes as neutrino photons.
12) The neutrino photons released from the Black Holes provide galactic gravity for star systems surrounding the Black Holes; participate in electron-positron pair production; and participate in proton and anti-proton creation.

Now back to my explanation of spin.

PHOTON SPIN

Each photon has a spin of 1, meaning the spin of the photon is equal to the reduced Planck number (i.e. h-bar = h/2π = 1.054570203 x 10^{-34} Js or 1.054570203 x 10^{-34} kgm^2/s). Every photon is an entron traveling within the photon in a circle having a diameter equal to about 911 times the diameter of its entron and 2/π (about 0.6366) times the photon's wavelength. Photons and entrons range in size, mass and energy over 16 orders of magnitude. The entrons have diameters ranging from 0.9339 X 10^{-18} m to a few centimeters. The entron's speed within each photon is 2 times the speed of light, but its speed through space during each of its periods ranges from three times the speed of light to minus the speed of light. The circle's speed through space is constant at the speed of light. So, the shape of the entrons path is that as shown in FIGS. 3 and 4 from my book and a little more precisely in FIGS. 3A and 4A which are attached to this paper.

The photon's spin is equivalent to the angular momentum of the photon. The photon's angular momentum cannot be explained based on currently accepted theories. The photon spin can easily be explained based on the Ross Model. A video of a photon highlighting its angular momentum can be viewed on the Internet at tronnies.com.

According to my model the spin of every photon in our Universe can be calculated simply according to the following angular momentum formula:

$$Spin = (r)(m)(v)$$

Where: m is the photon's mass which is also its entron's mass, v is the velocity of the entron in the photon and r is the moment arm of the circling entron in the photon. We

can calculate the photon spin relative to: (1) the photon's frame of reference in which its entron is spinning and (2) the space through which the photon is traveling.

Photon Spin Relative to Space through Which the Photon Is Traveling

Mass, m

The energy E of each photon and its entron is inversely proportional to the photon's wavelength, and the formula for photon energy is the same for every photon: i.e. $E = hc/\lambda$ where h is Planck's constant, λ is the photon wavelength and c is the speed of light. The energy of each photon and its entron is also equal to $E = mc^2$ where m is the mass of the photon and its entron and c is the speed of light. Therefore the mass of the photon and its entron is equal to $m = E/c^2$. If we substitute hc/λ for E we see that the mass of each photon and its entron is:

$$m = (hc/\lambda)/(c^2) = h/\lambda c$$

For the green light photon: $\lambda = 5.42 \times 10^{-7}$ m, h is 6.626×10^{-34} kgm^2/s^2 and c = 3×10^8 m/s. So m = 4.08×10^{-36} kg.

Velocity, v and Moment Arm, r

Each photon is comprised of one entron which in turn is comprised of one plus tronnie and one minus tronnie with each tronnie traveling on opposite sides of the entron's circle at speeds of $\pi c/2$. In order for each of the two tronnies to stay ahead of its own Coulomb force wave the entron must travel within the photon at a speed of 2c (see FIGS 2C and 2D of my book). However, the photon must travel in a forward direction at a speed of c, so as to not out run its own combined Coulomb forces. So the entrons travels within the photon at 2c and the photon travels forward at the speed of c, the speed of light. As a result of all of this, as explained above, the entron's paths are as shown in FIGS. 3A and 4A attached. As shown in FIG. 4A, the entron's forward speed through space varies during each wavelength cycle from 3c to minus c. The entron's path through space defines a top half of the path and a bottom half of the path as shown in FIG. 4A. In the top half of the path its forward speed varies from plus c to plus 3c and back to plus c. In the bottom half of the path (referred to as "the lower loop"), the entron's speed is specified below and in FIG. 4A at positions J, K, L and M. These speeds respectively are as shown in the following table:

ENTRON SPEEDS IN PHOTON LOWER LOOP

POSITION	SPEED	DIRECTION
J	c	Horizontal, forward*
K	2c	Vertical, downward
L	c	Horizontal, backward
M	2c	Vertical, upward

- The speed at J has vertical components, but they are parallel to the lower loop moment arm at position J, so they don't count toward angular momentum.

Also shown in FIG. 4A are moment arms at positions J, K, L and M. (We use only the lower loop half of the entron's path because in the upper half the entron is traveling faster than the speed of light, so the entron does not react with anything in the space through which it is traveling. In the lower loop the entron is traveling in a teardrop-shaped loop around a single stationary point in the space. In this loop, the entron speed ranges from plus c (in the horizontal direction) to 2c down to minus c (horizontal – backward) to 2c up and back to plus c (horizontal), the length of its moment arm (i.e. the distance between the stationary point and the entron) is changing from λ/2π to λ/4π to π/2π to λ/4π and back to λ/2π. The moment arms at J and L have a length of λ/2π. The moment arms at positions K and M have a length of λ/4π. As explained above the mass of every entron in our Universe is m = hc/λ. I use this value, along with these values of velocity and moment arms at positions J, K, L, and M to estimate the <u>average angular momentum</u> of the lower loop shown in FIG. 4A:

Average angular momentum = $(L_J + L_K + L_L + L_M)/4$

$$= \frac{(h/\lambda c)(c)(\lambda/2\pi) + (h/\lambda c)(2c)(\lambda/4\pi) + (h/\lambda c)(c)(\lambda/2\pi) + (h/\lambda c)(2c)(\lambda/4\pi)}{4}$$

$$= h/2\pi = 1.0545 \text{ X } 10^{-34} \text{ Js.}$$

I propose but have not yet proven that at all points on the lower loop, the product of the moment arm and the tangential velocity is equal to λc/2π. So when we multiply by the mass of the photon, we get the average angular momentum:

$$L = h/2\pi$$

This is the spin which is measured by scientists with instruments situated in the space through which the photons are traveling.

Photon Spin Relative to the Photon in Which the Entron Is Traveling

We can also calculate the angular momentum of the entron in the photon frame of reference by reference to FIG. 3A.

Moment Arm, r
We see that the moment arm of the entron (the radius of the photon circle) is equal to λ/π.

Mass, m
As to mass, we see that the velocity of the entron is 2c. We recognize that mass is a measure of a body's resistance to change in speed or direction. We can easily calculate the energy of the entron in the photon's frame of reference. It is:

$$E = ½ mv^2 = ½ m(2c)^2 = ½ m4c^2 = 2mc^2$$

But we know that the entron energy is:

$$E = hc/\lambda$$

So:

$$hc/\lambda = 2mc^2$$

Therefore:

$$m = hc/\lambda 2c^2 = h/2\lambda c.$$

Velocity v
The velocity of the entron in the photon frame of reference is:

$$v = 2c$$

So the angular of the photon in the photon frame of reference is:

$$L = (r)(m)(v) = (\lambda/\pi)(h/2\lambda c)(2c) = h/2\pi = \text{h-bar}$$

(The reader should note here that this analysis requires that the entron have a mass in the photon frame of reference that is one-half of its mass in the space through which the photon is traveling. We might ask, ”Can we justify a different mass of the entron in these two frames of reference?” My answer is: “I don’t know.” However, by using the reduced mass, I was able to calculate an entron spin of h-bar for the entron in the photon. I suppose we should expect that the entron mass in the photon frame of reference should be less than it is in the space frame of reference, since in the forward direction the momentum of the photon is zero in the photon reference frame.

What Does It All Mean?

Therefore, every photon in our Universe, which have masses that range over 16 orders of magnitude and wavelengths that range over 16 orders of magnitude, has the exact same spin! So, the spin is real. Spin is extremely real. Photon frequencies are:

$$f = c/\lambda$$

So, for example, the green light entron circles within the green light photon at a frequency of

$$f = (3 \text{ X}10^8 \text{ m/s})/5.42 \text{ X}10^{-7} \text{ m} = 5.535 \text{ X } 10^{14} \text{ cycles per second}$$

within the green light photon. In the green light entron the two tronnies circle within the entron with a frequency of:

$$f = c/2d' \text{ where } d' = \text{the entron diameter} = 3.77 \text{ X } 10^{-10} \text{ m}$$

$= (3 \times 10^{8}\ m/s)/(2)(3.77 \times 10^{-10}\ m = 3.98 \times 10^{17}$ cycles per second.

The most energetic entron, the neutrino entron, circles within the neutrino photon at a frequency of:

$f = (3 \times 10^{8}\ m/s)/1.335 \times 10^{-15}\ m = 2.247 \times 10^{23}$ cycles pre second.

In the neutrino entron the two tronnies circle within the neutrino enron with a frequency of:

$f = c/2d'$ where d' = the entron diameter = 0.9339×10^{-18} m
$= 3 \times 10^{8}\ m/s/(2)(0.9339 \times 10^{-18}\ m) = 1.60 \times 10^{26}$ cycles per second

The two tronnies in the green light entron circle within the green light entron at a rate of about **0.4 billion-billion cycles per second!** The two tronnies in the neutrino entron circle within the neutrino entron at a rate of 160×10^{24} /second. That is **160 trillion-trillion cycles per second!** So spin is really real.

The Entron Paths

While we are looking at FIGS. 3A, 4A and 4B, we might make some additional comments that the reader may find interesting. You may want to think about the speed of the entron at particular points on the path in the photon frame of reference and the space through which the photon is traveling. For example the entron is traveling at 3c for only an instant. And it is traveling at minus c for only an instant (one point on the path) as shown in FIG. 4A. But in the upper drawing in the photon frame of reference it is traveling at a speed of 2c all the time. At position J in the bottom drawing FIG. 4A, the entron is traveling at a speed of c in the horizontal direction. There are also vertical components of the speed at Position J but the vertical components do not affect angular momentum at J since these vertical components are not perpendicular to the moment arm at J. At positions M and K the entron is traveling at 2c at only one point, down at K and up at M. So in the bottom loop of FIG. 4A the speed changes from plus c (horizontal) to 2c down to minus c (horizontal) to 2c up back to plus c (horizontal). The moment arms at J, K, L and M change inversely so that the product of moment arm and velocity is constant at $c\lambda/2\pi$ al around the lower loop. The mass doesn't change, so the angular momentum is constant around the lower loop, and the center of the teardrop path is stationary while the photon is traveling at 186 thousand miles (300 million meters) per second!

Another thing I am emphasizing is the sizes of the entron relative to the photon and the two tronnies of the entron. I show it (the entron) as a dot at the end of the dashed path of the entron since its diameter d' is 911 times smaller than the photon diameter d. And the entron is shown expanded in little FIG. 4B. In this FIG. 4B the entron's two tronnies are shown as dots since the tronnies have no size at all. Now, on to electron spin

ELECTRON SPIN

Before we can explain the electron spin, we need to understand the internal structure of the electron. As explained in **Chapter VII, "Electrons and Positrons"** of my book the electron is comprised of three tronnies, a plus tronnie traveling in a 0.9339 X 10^{-18} m diameter circle at a speed of π/2 times the speed of light and two minus tronnies circling perpendicular to the plus tronnie's path 90 degrees behind the plus tronnie. FIG. 5 attached is a drawing of the electron. The positron is exactly opposite the electron with one minus tronnie and two plus tronnies.

Electrons and positrons are produced only one way, i.e. by the combination of three entrons:

1) A neutrino entron having a diameter of 0.9339 X10^{-18} m.
   Its photon, the neutrino photon, has a diameter of 0.85 X 10^{-15} m.
2) A 1.02 MeV gamma ray entron having a diameter of 0.85 X 10^{-15} m.
   Its photon, the 1.02 MeV gamma ray photon, has a diameter of 7.7 X 10^{-13} m.
3) A 1.12 KeV entron having a diameter of 7.7X 10^{-13} m.
   Its photon, the 1.12 KeV photon, has a diameter of 7.05 X 10^{-10} m.

These three entrons are all resonant with each other, (i.e. the 928 MeV neutrino photon is resonant with the 1.02 MeV entron and the 1.02 MeV gamma ray entron is resonant with the 1.12 KeV entron). There is throughout every galaxy a tremendous flux of neutrino entrons and the neutrino photons that the entrons are a component of. This is because the neutrino photons are produced in Black Holes at the center of each galaxy in enough quantity so as to provide the gravity that holds the star systems of the galaxies together circling the Black Hole. (As explained in Chapter XX of my book, I estimate that the neutrino photon flux at the position of our solar system is about 68,000 photons per square meter-second.) The 1.12 KeV photon is an ultraviolet photon which is produced in great quantities in stars which spread these photons throughout the universe with very high fluxes in the space surrounding the stars. The 1.02 MeV photons are rarer, but whenever we have them, we will have pair production taking place.

In the course of pair production the angular momenta of the 1.02 MeV enron and the 1.12 KeV entron are conserved as their moment arms are tremendously decreased and their frequencies are inversely increased, but their spins remain the same at h-bar. The spin of the neutrino entron is a vector defining a z-direction and the spins of the other two entrons define directions always perpendicular to the z-direction and aligned with a direction 90 degrees behind the moment arm of the neutrino entron (see FIG. 5).

The masses of the three entrons are respectively: 1.65 X10^{-27} kg, 1.82 X 10^{-30} Kg and 1.99 X 10^{-33} kg. So the total mass of the combination is very slightly more than 1.65 X 10^{-27}. When the entrons combine the neutrino entron dominates with its relatively tremendous mass, so its two tronnies continue to circle with a diameter of 0.9339 X10^{-18} m. The other four tronnies then begin to circle through the circle of the neutrino entron with diameters corresponding to the diameter of the neutrino entron. Very quickly, however, the four tronnies of the two lower-energy entrons decide to split up with the two plus tronnies choosing the minus tronnie of the neutrino entron and the two minus

tronnies choosing the plus tronnie of the neutrino entron. So the six tronnies of the combination split into an electron and a positron; and the electron and the positron head off in separate directions, each self-propelled at a speed of 2.19 X 10^6 m/s. This self-propelled 2.19 X 10^6 m/s speed of the electron and the positron is explained in my book. Also, this velocity value is easily calculated from equations developed by Niels Bohr more than 100 years ago.

So we can use this information to explain electron spin.

Pair Production – Conservation of Angular Momentum

As indicated above, the mass of the neutrino entron (at 1.65 X 10^{-27} MeV) is very large compared to the the masses of the other two entrons (the 1.02 MeV and the 1.12 KeV entrons) so the mass of the three entrons is approximately equivalent to the mass of the neutrino entron.

As explained above, in the three-entron combination, the two tronnies of the neutrino entron circle in a 0.9339 X 10^{-18} m diameter circle and the other four tronnies circle perpendicularly the path of the two neutrino entron tronnies with the same diameter of 0.9339 X 10^{-18} m. The three entron combination would have a mass slightly greater than 1.65 X10^{-27} kg and an angular momentum which corresponds to the combination of the three entrons. However, since angular momentum is a vector quantity, the combination is complicated. But the angular momentum in the vertical (z) direction is 1 (i.e. h-bar, the same as the angular momentum of the neutrino entron), since I am assuming that the tronnies of the neutrino entron is circling in the x-y plane and the paths of the other four tronnies are all perpendicular to the path of the two neutrino entron tronnies (one plus and one minus).

So, in the three-entron combination angular momentum is conserved and mass/energy is also conserved. However, when the three entron combination splits into an electron and a positron, half of the angular momentum of the combination goes equally to the positron and the electron. So angular momentum is also conserved. However, it is clear that mass-energy is not conserved. This is made clear by the following comparison:

Combination	Mass – Energy
Mass of the three entrons:	About 1.65 X 10^{-27} kg - 928 MeV
Mass of one electron and one positron:	About 3.64 X 10^{-30} kg - 1.02 MeV

The reason for the loss of mass energy relates to the fact that the mass of entrons is inversely proportional to the diameter of the circling oppositely charged tronnies. The separation of the tronnies in the neutrino entron is constant at 0.9339 X 10^{-18} meters which means that the instantaneous forces between the two tronnies is according to Coulomb's Law:

$$F = kQ_1Q_2/d^2 = (8.99 \times 10^9\ Nm^2/C^2)(1.602 \times 10^{-19}\ C)^2/(0.9339 \times 10^{-18} m)^2$$
$$= 26.45 \times 10^7\ N.$$

This is 264 million newtons equivalent to about 59 million pounds! This is the repulsive force each of the two tronnies of the neutrino entron feels from itself across the diameter of the neutrino entron. It is also the component of the attractive force (in the diametrical direction) from its partner coming at an angel of about 53 degrees relative to the diametrical direction of the entron (see FIG. 2B on page 34 of my book). If we integrate this force (in the diametrical direction) around the circumference of the entron, we get an energy value of about 48.4 X 10^8 eV which is in the ballpark but about 5.2 times my of 9.28 X 10^8 MeV estimate of the energy of the neutrino entron. The paths of the tronnies of the electron and the positron are also separated by roughly the same distances as the tronnies in the neutrino entron; however, the separation is not constant but varies continuously between about d/2 to about d. This may explain why the mass of the neutrino entron is so much greater than the mass of the electron and positron. (Also, if you are concerned about conservation of mass-energy, you should not be, because when the positron from pair production very quickly combines with an electron, both particles are annihilated, and the result is two gamma ray photons and a neutrino photon which together have the same mass-energy as the three entrons that produced the electron-positron pair.)

The tronnies of the lower-energy entrons continue to circle the path of the two tronnies of the neutrino entrons in both the electron and the positron as shown in FIG. 5 of my book. The result is the electron and the positron end up with an angular momentum of one half in the direction perpendicular to the circles made by each of the two tronnies of the neutrino entron. The tronnies of the lower energy entrons are circling perpendicular to the paths of the tronnies of the neutrino entron in both the positron and the electron. So their circles are parallel to the moment arms of the electron and the positron 90 degrees behing the tronnies of the neutrino entron. So the tronnies of the neutrino entron govern the spin direction of the electron and the positron. In that direction the angular momentum is one-half the angular momentum of the neutrino entron photon. The angular momentum of the neutrino entron is the same value as the angular momentum of all photons (i.e. h-bar). So the angular momentum of each of the electron and the positron is one-half h-bar.

We can be a little more specific for the spin of the electron looking at the electron drawing in FIG. 5 on page 56. Before we get too far in this discussion of electron spin, we need to consider what electron spin and angular momentum is. Angular momentum is the product of mass, velocity and moment arm and spin is the same as angular momentum. Ross model values for these values are:

Plus tronnie mass = zero
Electron mass = 9.109 X 10^{-31} kg
Velocity of each of the three tronnies = $\pi c/2$
Radius of the tronnie ‘s circles = 0.46695 X 10^{-18} m

Obviously, using values like these we could never derive an angular momentum (L = mvr) for the electron anywhere close to one half h-bar (about 0.527285 X 10^{-34} Js).

(Using the above values would give us a spin of 20.04 X 10^{-39} kg-m^2/s = 2.004 X 10^{-38} Js.)

We are stuck with the size of the electron. It is less than 1 X 10^{-18} m. The velocity of the tronnies is πc/2. To confirm that the spin of the electron is really equal to one half h-bar, we need a much larger mass for whatever is spinning inside the electron. So let us review again how the electron is made in pair production. As explained the electron and the positron is made from the combination of:

1) A 928 MeV (1.65 X 10^{-27} kg) neutrino entron.
2) A 1.02 MeV (1.82 X 10^{-30} kg) gamma ray entron.
3) A 1.12 KeV (1.99 X 10^{-33} kg) entron.

The neutrino entron has a mass of h/λc as explained above. However, when the combination of six tronnies of the three entrons split off into the three tronnies of the electron and the three tronnies of the positron, the total mass was reduced from about 1.65 X 10^{-27} to 2 X 9.109 X 10^{-31} kg = 18.218 X10^{-31} kg with a corresponding energy reduction from 928 MeV to about 1.02 MeV. This may appear to be a violation of conservation of mass-energy. However, when we look at angular momentum we see that at least conservation of momentum may not be violated. All three of the entrons have a spin of 1 and the electron and the positron each have a spin of ½ in the z direction. We should recognize that the photons are two-dimensional but the electron and the positron are each three dimensional.

Spin is usually measured and reported in the z direction. My understanding is that the electron and the positron have spins of ½ in two other directions. If this is true then there would be a perfect conservation of angular momentum. That is, before pair production we have a total spin of 3. After pair production the positron spin is spin is 3 X 1/2 = 3/2, and the electron spin is 3 X 1/2 = 3/2 for a total spin of 3.

PROTON SPIN

The Creation of Protons

In order to understand proton spin we need to understand that protons are created by:

(1) the combination of a neutrino entron with an electron and

(2) the combination of the capturing electron with two positrons.

A neutrino entron is two tronnies (one minus and one plus traveling on opposite sides of a 0.9339 X 10^{-18} circle at speeds of π/2 times the speed of light. The neutrino entron travels through space in a much larger circle of about 0.85 X 10^{-15} m at twice the speed of light and forward at the speed of light along a looping path as shown in FIG. 4 in my book and FIG. 4A attached. The neutrino entron is captured by an electron only when the two tronnies of the neutrino entron are able to loop through the center of a capturing electron during a lower loop of the neutrino entron's path when the entron is traveling at speed comparable to the electrons speed which is typically in the range of about 2.19 X 10^6 mps. The neutrino entron is traveling at this speed twice during each of its cycles. The wavelength of the neutrino photon is 3.35 X 10^{-15} meters and the neutrino entron

makes about 358 cycles per wavelength. I have estimated the neutrino entron flux here on earth from the Black Hole at the center of our galaxy at about 68,000 neutrino entrons per square meter per second. In typical atomic masses there are substantially more than 10^{24} electrons per gram-atom. So neutrino entrons have many opportunities to be captured by an electron in their passage through objects in space such as the earth or me or you, the reader. My wild guess is that about one percent of the neutrino entrons illuminating the earth are at least temporally captured by an electron. However, nearly all of these captures are temporary since there are relatively very few free positrons available on earth to permit the formation of protons. But shortly after the Big Bang there were many free positrons and there is an abundance of positrons in Black Holes. Also, positrons are produced in pair production events so production of protons is possible today on earth. In any case since the beginning of time there have been many protons created and they all have been created by:

(1) the combination of a neutrino entron and an electron to form a very heavy , high-energy electron, and

(2) the combination of two positrons with the high-energy electron.

Calculation of Proton Spin

The energy of all photons (including the neutrino photon) is:

$$E = hf = hc/\lambda$$

We can convert this energy to mass using $E = mc^2$

So:

$$m = (hc/\lambda)/c^2 = h/\lambda c.$$

When an electron combines with a neutrino entron, the two tronnies of the entron circle through the center of the electron path and pull the electron in a circular path in which the product of the average entron speed and the average moment arm in the lower loop of the neutrino entron path as shown in FIG. 4A. Referring to Positions J, K, L and M, we see that:

Position:	J	K	L	M
(r)(v) =	$(\lambda/2\pi)(c)$	$(\lambda/4\pi)(2c)$	$(\lambda/2\pi)(c)$	$(\lambda/4\pi)(2c)$

$$\frac{}{4}$$

$$(r)(v) = c\lambda/2\pi.$$

The neutrino photon disappears and the two tronnies of its entron circle through the center of the electron and a speed of $\pi c/2$. So the spin associated with the neutrino entron is the mass of the neutrino entron ($h/\lambda c$) multiplied by the above $(r)(v) = c\lambda/2\pi$. This is $L = mvr = (h/\lambda c)(c\lambda/2\pi) = h/2\pi$, which is equal to h-bar. However, we have to consider the contribution of the electron to this combination of the electron and the neutrino entron. We know that the electron has a spin of ½ h-bar. The spin of the neutrino entron must be in a direction opposite the spin of the electron, so the net spin

of the combination is the difference between the neutrino entron spin and the electron spin ½ h-bar. So the spin of the combination is ½ h-bar, but as stated above this combination in unstable and will quickly decay releasing the neutrino entron as a neutrino photon in random directions and also releasing the electron. For a naked proton to be formed the electron-neutrino entron combination needs to capture two positrons before it decays. If and when that occurs the two positrons will circle the path of the energetic electron 90 degrees behind the massive electron and perpendicular to the path of the electron, so the two positrons do not affect the spin of the massive electron-neutrino entron combination in its z direction. (Remember proton spin is measured in its z direction.) So the naked proton has a spin of ½ h-bar, in its z direction.

As explained in Chapter VIII of my book naked protons are self-propelled at a speed of 4.02×10^7 m/s and slow down by capturing gamma ray entrons. (These gamma ray entrons may much later be released in fusion processes in stars and hydrogen bombs.) These gamma ray entrons also circle through the path of the mssive electron in the proton and also do not affect the spin of the proton.

So for all of the above reasons, the spin of the proton is

½ h-bar.

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