Defining Particles.

Willem F. Esterhuyse

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Abstract

We define particles as diagrams. The model predicts why Photons can have a variable frequency. The model predicts that an Electron will have properties analogous to magnetic moment: isospin moment and mass moment (spin angular momentum). The charges on a Pi-minus are determined by the quarks it is made of. The charges on an Electron and an Electron antineutrino follow from the charges of a Pi-minus. The model explains how a Muon and Tau particle can have the same properties as an Electron except for the mass. The model also predicts how to make Muons from Electrons and Tauons from Muons or Electrons. The model goes further than string theory (supposedly encoding the name of the particle in vibrations) by encoding the charges of the particle inside the particle. The model predicts that a particle like the Electron but without isospin exists. Also predicted by the model is that it is inconceivable for a d-quark to emit a W-boson, so we explain neutron decay differently. The model does not require infinite density like for point charges or infinite field strength like for strings in string theory. A quantum theory for gravity may follow from this model since I define the particles with built-in gravitons.

1.0 Introduction.

This paper uses ref. [1].

1.1 Definition of Particles.

We derived the relevant structure from axioms in ref. [1]. A pi minus looks as follows:

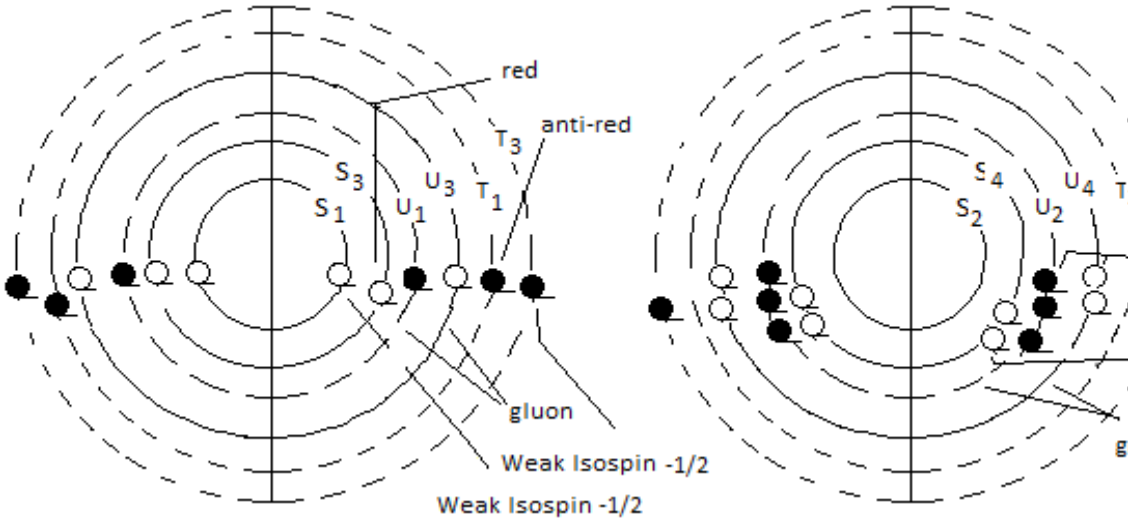

Figure 1.1: Pi-minus.

The solid circles are added spacetime events and the dotted circles are left out spacetime events. We encode the charges of an anti-up-down. The anti-up charges go onto S_1, S_3, S_4, and the down quark charges go onto T_1, T_3, T_4. U_1 with U_3 is a Gluon and U_2 with U_4 is a Graviton. Open circles denote antiquark charges and closed circles denote quark charges. S_2 or T_2 can play the part of the clock particle.

It follows that an electron looks as follows:

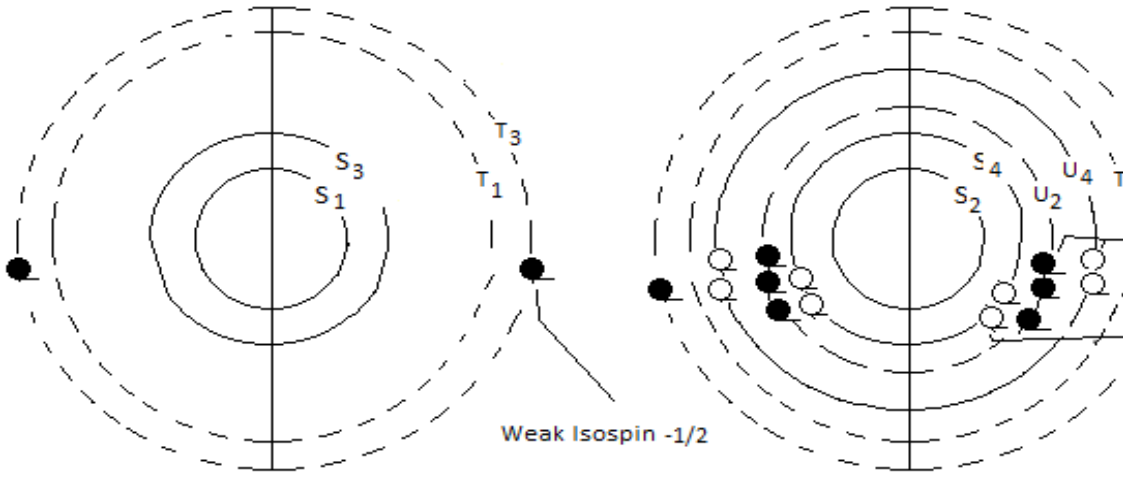

Figure 1.2: Electron.

Since we have weak isospin and mass charges on the electron, we would have isospin and mass moments for the electron. Color charges cancel and do not produce a moment.

For two electrons of opposite spin and occupying the same quantum state (not spin state), the other electron can spin opposite the other and be upside down so that the two equatorial planes overlap. Then the spin magnetic moment will almost cancel.

Muons can be made from Electrons by bombarding the Electrons with Gravitrons of the appropriate mass. Similarly for Tauons.

It follows from Figure 1.1 that an Electron anti-neutrino looks as follows:

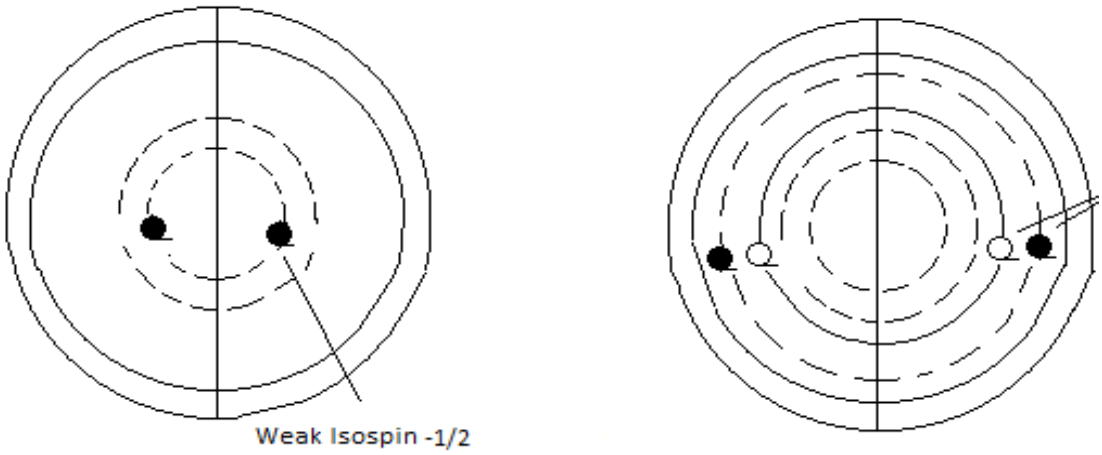

Figure 1.3: Electron Anti-neutrino.

Note that the solid and dotted circles are opposite to the electron circles. The circles are created in space in opposition to the electron circles. The circles are initially unoccupied by charges.

Similarly to the Electron, an Electron antineutrino will have isospin and mass moments.

Counting the circles it makes most sense if the particles are in 6/2 = 3 dimensions.

W-minus must make up the difference between the Electron and Electron anti-neutrino.

The W-minus Boson looks like:

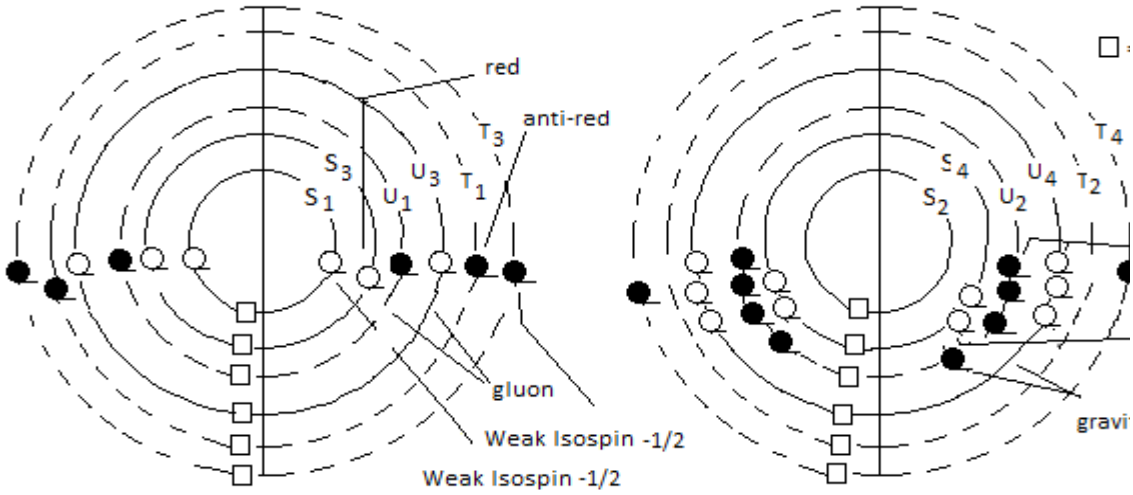

Figure 1.4: W-minus Boson.

It is inconceivable that a down quark can emit this (see Figure 1.4). CI stands for Copy and Invert (an operation specification). This is coded for in the W-minus field and manifests in space as added events. In this case, the usual explanation for neutron decay is untenable, so here is the alternative explanation. Neutron decay happens as follows: a u-anti-u quark pair get produced from energy close to the neutron. An u and d quark change places forming a proton and pi-minus. The pi minus decays into an electron and electron anti-neutrino. Other weak decays have similar explanations.

There are three issues with this picture:

1. How do the W-minus encode the fact that one unit of weak isospin must disappear from both the particles it will decay to?

2. How does the mass convert to the kinetic energy of the product particles?

3. How is it encoded in the W-minus that mass must convert in the product particles?

4. How is it encoded in the W_minus that it must decay to a colorless electron and electron anti-neutrino?

For 2-3 we need an operator to change mass into energy and vice versa.

Since the particles that the W decays to do not come from the vacuum, the particle and antiparticle do not need to have complementary quantum numbers. The W provides the template so the resulting particles must reflect this.

It could be that spacetime sees the blocks as a mass but the electromagnetic field sees it as operators.

1.2 Electron spin

An electron spins because the charge wants to be a continuous circle. Since the charges are concentrated at points, space would make it spin for the purpose to conform to the laws of physics. Since the circles the charges are on can spin independently, they could spin such that the electron only looks the same after two cycles of an electric charge circle.

The dotted line circles spin in the opposite direction than the solid line circles since this is the nature of superimposed Riemann Spheres and anti-Riemann Spheres. They can stand being superimposed on each other if one spins in the opposite direction of the other. Ther can be 3 Riemann Spheres superimposed on each other, since space allows it due to the 3 times intersecting point (0) in 3-dimensions.

2. Photons

To provide a mechanism to start a protophoton to go at the velocity of light we need a slight force (any size of force). Since a protophoton is massless we only require a small force to accelerate it to the speed of light in an instant. The protophoton becomes a photon when accelerated to the speed of light.

We proceed to explain how an electron emits a photon. The photon is emitted at the

same moment as when the electron momentum changes. At this instance of time, the electron knows both the initial and final momentum. In the following figure, we show the state of affairs just before the momentum changes. Lines A-B and C-D show the intersections of the ABCD plane with the relevant planes. The direction of the momentum of the particle is determined by this plane. The momentum is a vector orthogonal to the ABCD plane. The ABCD plane is determined by two angles: theta and phi. The charges all go below these lines. The angles are small for large energy and large for less energy. The intersections of the plane with the Riemann Spheres are represented in the particle: where the charges are located.

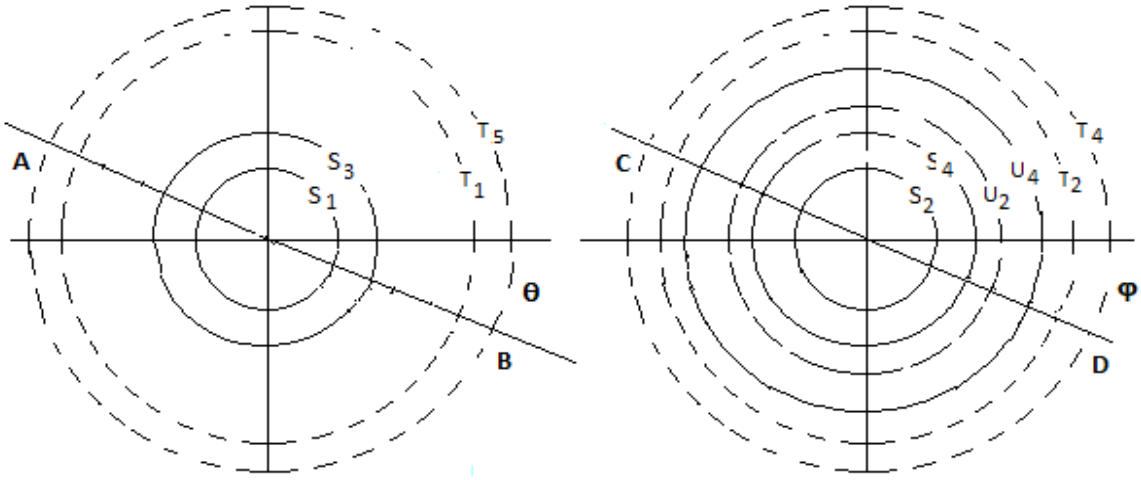

Figure 2.1

The state of affairs at the instant of emission is shown in the following figure. If this state of affairs is frozen in time it would be an electron with two momenta superimposed with a protophoton of light depending on the change in momentum. The protophoton is not yet moving at the speed of light. A double momentum is illegal so space copies the Riemann Sphere S_1, S_2 for the purpose to comply with the law.

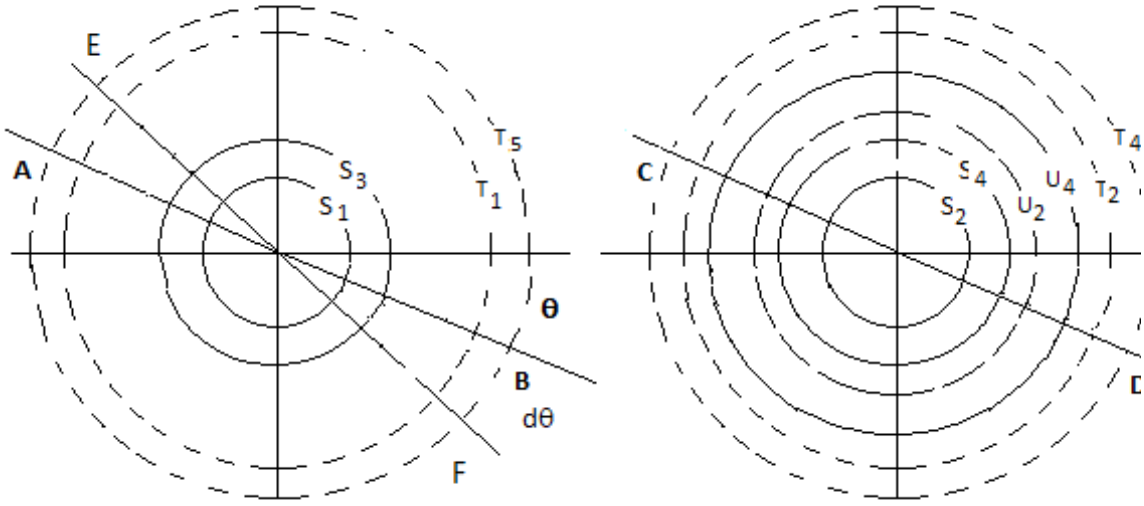

Figure 2.2

A small force develops when the protophoton disengages the electron and engages spacetime events: d units to the top-right. This causes two forces parallel to the ABCD plane in opposite directions. This in turn creates two reaction forces of equal strength perpendicular to the ABDC plane. A few instants later the protophoton becomes a photon moving at the speed of light in the direction of the electron momentum difference.

We might want to suggest the following: the forces on a photon must cancel so define a photon as engaging a positive event to the right side at distance d, then the two forces cancel: the two start points of the force vectors overlaps since the photon sees all events along its geodesic as at the same position. This precludes stating Figure 1.3 of [1], so I'd rather keep the forces operating on the photon and say that resistive forces are generated in the opposite direction. These four forces cancel at light speed.

A photon must slow down when entering a medium and keep the same speed in the medium. Thus only for a short time, the friction force must be larger than the propulsion force. The propulsion force must then grow stronger to cancel the friction force. This can

be seen to happen by looking at a photon drawing. The photon encounters a medium and the points at E and F experience a friction force, slowing the photon down (see Figure 2.3). Between the time when the photon overlaps the medium between E and B the photon slows down but when events of the medium engage B and A the propulsion force enlarges and cancels so the photon goes at a fixed speed in the medium.

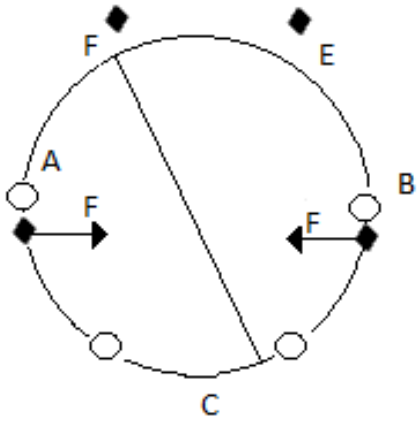

Figure 2.3

We predict that photons of different frequencies have different sizes.

Refraction from a denser to a less dense medium occurs as in figure 2.4. The axis of the photon (where the top charges are located) is shown in various positions:

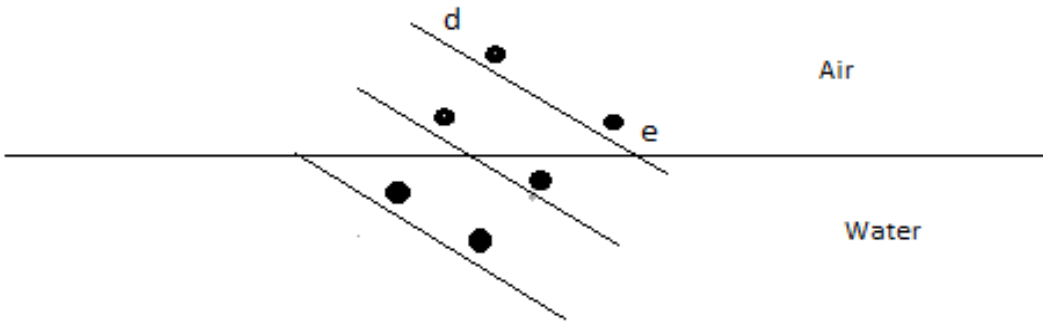

Figure 2.4

This shows that the photon would turn clockwise due to d > e. This is the correct direction.

Thus it requires off space to align itself according to the trajectory of the light. Then the refraction is in the right direction. This follows also from the independence of the refraction angle from the position of the incident light (it doesn't depend on position). The "alignment" is not in actuality space that conforms to photon whims, but rather: space is random enough that photons can choose events (to engage) so aligned.

The case for total internal reflection is shown in the following figure:

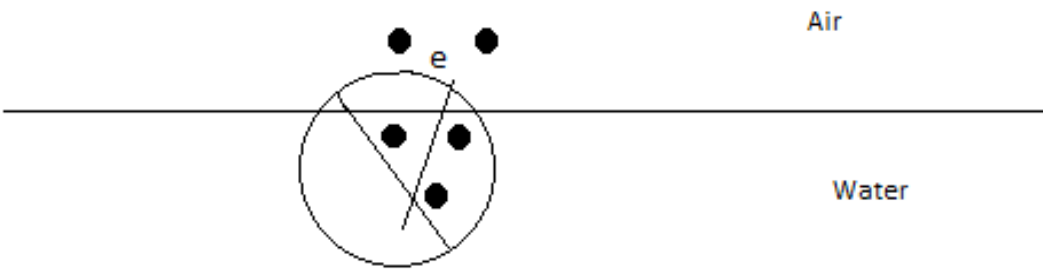

Figure 2.5

Because the photon experience less of a friction force (due to events not shown) at e, the photon must turn clockwise until reaching the state shown by the line at e.

For the wave properties of light, we specify it as particles riding on waves as in Pilot Wave Theory.

Bibliography

[1] Esterhuyse W. F., Physics from Axioms, JOURNAL OF ADVANCES IN PHYSICS, 16(1), 326-334. https://doi.org/10.24297/jap.v16i1.8382