Physics from Axioms.

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Abstract:

We introduce a definition of Time and Photons from four Axioms. Basically, you take a 4-dimensional manifold, transform them into two superimposed Riemann Spheres and isolate a circle (call this Pp) in one of the spheres. Then one specifies the circle to turn by a unit amount (the turn is an quantum rotation: turn from state A to state B without visiting the in-between states) as measured along the circle, every time the Pp encounters a space point. Space fluctuates and expands, so this does not give a static circle Pp. The circle's infinity point stays at the north pole of the Riemann Sphere for any finite rotation since infinity - constant = infinity. Using this, one can define basic spacetime and from basic spacetime, Time can be defined if we require special particles to be in the particles of a clock. We go on to define photons and antiphotons. The model predicts that there is a direction in which photons (from the same process) are never emitted. We continue to define a pi-minus.

Keywords: Time, Photon, Pi-Minus.

1. Defining Time.

Here are the four axioms we are going to use:

A1: Complex numbers exists. Call this C.

A2: x = x

A3: x + y = y + x

A4: A is a subset of B if B contains A and B - A not = the empty set.

The following definitions are stated and will be used:

Definitions: "C x C" means "Complex plane Cartesian product Complex plane."

"RS <-> RS" means "Riemann sphere superimpose on Riemann sphere".

"quantum rotation" means "a rotation from state A to state B without visiting the states in-between".

The format of the statements will be: Index Statement Reason

First, we construct a Space. This space will be required to define a particle.

1	Construct S = C <-> C.	A1, A2
1.1	S is 4 dimensional.	1
1.2	Set the components of S = $S_{1,2,3,4}$ in the following order: Re, I'm, Re, I'm.	1, A2

Cartesian product is a rotation of one C through 90 degrees and then superimposing the origins. This would cause the S_3-axis to superimpose on the S_1-axis if we turn the first C through 90 degrees. The reason that we could define this space is because of A1.

We define a particle called Pp next.

2	S can transform into two Riemann Spheres.	A1, 1
3	Construct two Riemann Spheres of S, call it RS <-> RS = Pp.	A1, 1

We define a circle along the Imaginary axis of the second RS: S_4.

4	Isolate a circle in the second RS namely S_4 and call it P_T.	A1, 3
4.1	I'm going to use physical terminology below.	Declaration
4.2	Construct "physical space" = S_P = CxC/S_4.	A1, A2

This gives physical space with S_{p2} multiplied by i.

5 Let P_T advance by one (rotate relative to $S_{1,2,3}$ by one as measured along the circle) when encountering a space node and let the rotation be a quantum rotation. Call this "freq" = T_S
A1, 4, 4.2, A2

This rotation does not move infinity at the north pole of RS since: infinity - constant = infinity. This circle cannot have a charge of the particle Pp on it. Space fluctuates and stretches so this does not give a static P_T.

7	Define "Change in freq" by T_{Sf} - T_{Si}	5
8	Let $S_{1,2}$ be perpendicular to $S_{3,4}$	1
11	Construct {for all n = 1 to N: $n(T_{Sf} - T_{Si})_n$} . Call this "Changes in freqs."	5,7

Now we can define a basic time interval:

12	Define "basic time interval" = Delta t_B = 1/[(1/N) \sum \limits_{n=1}^N $n(T_{Sf} - T_{Si})_n$]	1-11, A3, A2
13	Construct MxT_S, M element of Natural Numbers subset of C.	5, A4

From these define "Basic time":

14	Define " Basic time" = t_B = {1/[(1/M) (\sum \limits_{n=1}^M n#T_{Sn})]}*Delta t_B.	12, 5, A3
15	Couple t_B to every node of S_P and call the result "basic spacetime"= B_{ST}.	4.2, A2, A2

Now we can make a similar construction in order to define Time:

15	Construct S_i = C <-> C.	A1
16	Construct RS <-> RS in S_i, call it Pp.	15.1, 2
17	Isolate the Riemann Circle in Pp and call it P_{BT}.	A1, 16
18	Let P_{BT} advance by one (rotate relative to $S_{i1,2,3}$ by one measure along the curve of the circle) when encountering a B_{ST} node and let the rotation be a quantum rotation. Call this "freq2"= T_{BST}.	7, A2
19	Construct KxT_{BST}, K element of Natural Numbers, subspace of C.	18, A4

20 Define "Tim1" = t_1 = 1/[(1/K)(\sum \limits_{n=1}^K n#T_{BSTn})]. A3, A2, 18

21 Pp is in every particle of the clock. Requirement

22 Tim1 advances like a clock, it depends on the Pp in the clock and on the route in B_{ST}. 18, 21

23 Tim1 = Time. A2, 22

In practice we only require that every particle of the clock has a circle with no charges on it that can serve as the particle clock.

We go further to define photons. For this we need antiphotons as well. For this we need to define negative nodes of B_{ST}.

23.1 Construct negative nodes of physical space as: S_{P-} = (-C)x(-C)/Im {-C} A1

23.2 Couple ($-t_B$) to every node of S_{P-}. Call the result B_{ST-}. 14, 23.1

23.3 Shift the origin of B_{ST-} in B_{ST} by an amount: min{ distance of two adjacent nodes of B_{ST} along any axis of B_{ST}}/2 and do the same for all four directions. Call the result CB_{ST}. 23.2

23.4 Define the nodes and negative nodes of CB_{ST} to have closest neighbours in a helix for any direction in CB_{ST}. This is not pictureable. 23.3

24 Define a constant c = DS_P/Dt_B 4.2, A2

24.1 Let c be the maximum speed trough CB_{ST} i.e. the speed at which the particle sees no distance between succeeding nodes of CB_{ST}. 4.2, 23.3

24.2 Construct S = C <-> C . A1

25 From S, define a new RS <-> RS. 24.2

29 Construct S_{AP} = (-C) <-> (-C) A1

This way the particle and antiparticle may look identical except for phase difference of 180 degrees (as if turned through 180 degrees).

30 Construct from S_{AP} a RS_{AP} <-> RS_{AP}. Call it $\underline{F_1}$. 29, 2

31 Let CB_{ST} construct any vector in a RS <-> RS set = F_1, call it p. This is done by identifying four numbers in F_1. Call such particle qFp_1. 3, 18, 4.1

32 p is 4 dimensional 31

33 Construct the same vector as in 31 x (-1) in $\underline{F_1}$. Call such particle $\underline{qFp_1}$. 31, 28

34 Identify a marker in F_1's origin and at the origin in $\underline{F_1}$. 31, 33

35 Set Fp_1 = qFp_1 and leave out 2 distinguised points just below the unit circle crossing a curled up axis. Call the two points A, B. 24.2

36 Set $\underline{Fp_1}$ = $\underline{qFp_1}$ and leave out 2 distinguised points just below the unit circle crossing a curled up axis. Call the two points $\underline{A}$, $\underline{B}$. 29

37 Let S_1, S_2 of Fp_1 look like in Figure 1.1 24.2, 35

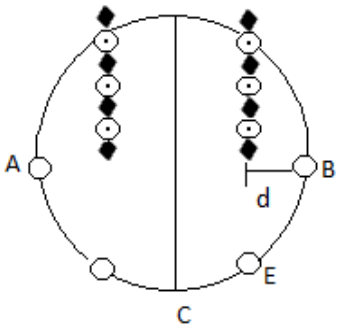

Figure 1.1

The little circles represent nodes of the circle that was left out. The figure shows an Fp_1. The diamonds are positive nodes of CB_{ST} and the circles with dots in the centre are negative nodes of CB_{ST}, as the particle sees them. The little circles denotes passive nodes, this is accompliced by letting the $\underline{Fp_1}$ take four nodes of Fp_1, now $\underline{Fp_1}$ would have four additions of nodes (see figure 1.2). The distance "d" is defined as a constant multiple of the interaction strength.

In figure 1.1, CB_{ST} chose a momentum vector in the up direction; however it cannot go precisely in the up direction since this would require infinite momentum.

38 Let S_{AP1}, S_{AP2} of $\underline{Fp_1}$look like in Figure 1.1, (just turned upside down and with nodes, negative nodes interchanged). 29 -> 32.1

39 Let the starting position (after one instance of time) of Fp_1 and $\underline{Fp_1}$ be as drawn in figure 1.2 (only the curled up S_1 and S_2-direction shown). 29

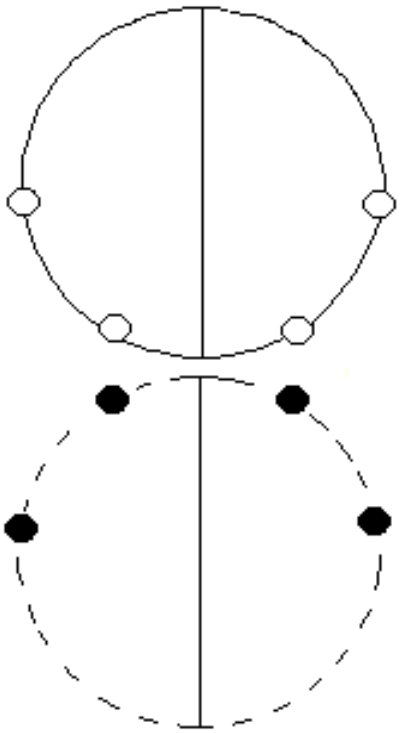

Figure 1.2

The figure shows a Fp_1 and $\underline{Fp_1}$ with the $\underline{Fp_1}$ taking nodes from Fp_1. We postulate that the $\underline{Fp_1}$ is made of negative nodes (S = (-C)x(-C)), so it carries the positive nodes (4 of them) from Fp_1. It is easily seen that the two annihilates if becoming superimposed. They are defined to have momentum in opposite directions.

40 Let the two endpionts of c_1, c_2 sense the closest two nodes of CB_{ST} in direction p and let them engage these nodes even if the whole Fp_1 needs to turn or move linearly. 35

41 If four nodes were engaged: distinguish two new nodes and go to 40. 35

42 Let $\underline{Fp_1}$ move similarly to 40, just sensing nearest nodes of negative coordinates in the down direction. 35

43 Fp_1 and $\underline{Fp_1}$ may be polarised: circularly, transversely or longetudinally. 37

43 is true since the point at infinity gives Fp_1 an orientation in CB_{ST}.

45 Fp_1 has spin 1. 44, 23.4

This is true since Fp_1 looks the same if turned through 360 degrees and because CB_{ST} is helical in any direction.

46 The nodes of CB_{ST} causes a force with nonzero component in the up direction. Define F = ma. With m = 0 we have infinite acceleration thus infinite speed. But infinite speed would saturate at c. Hence Fp_1 goes upwards at the speed of light. 24.2, 37

47 That the movement of Fp_1 causes Electro-Magnetic waves can be seen from the following figure. The F forces have a tiny reaction force in the up direction. figure 1.3

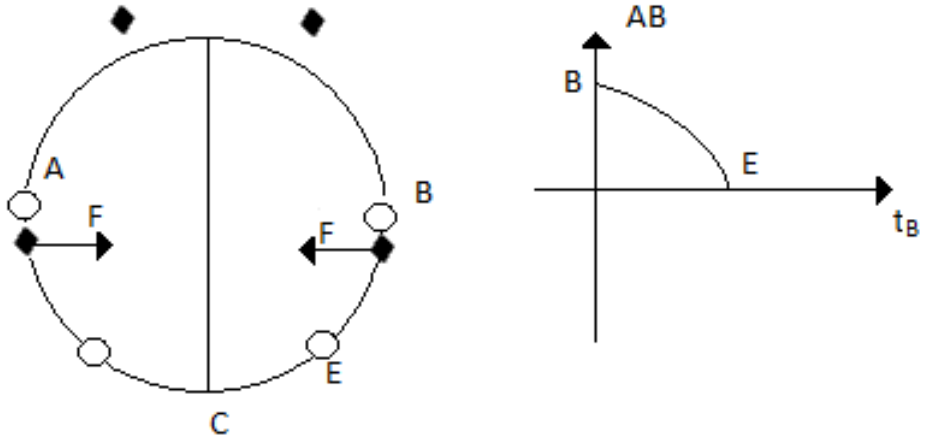

Figure 1.3

48 Fp_1 gets deflected if CB_{ST} is curved by gravity. 37

49 Fp_1 is a photon. 43 -> 48

49.1 $\underline{Fp_1}$ is an antiphoton. 43 -> 48

Next we define a pi-minus:

50 Construct S = C <-> C A2, A1

51 Construct two Riemann Spheres from S, call it RS <-> RS = G_1 50, A2

52 Construct T = (-C) <-> (-C) A2, A1

53 Construct two Riemann Spheres from T, call it RS_2 <-> RS_2 = H_1 A1, A2

54 Construct U = C <-> (-C) A2, A1

55 Construct two Riemann Spheres from U, call it RS_3 <-> RS_3 = g 54, A2

56 Construct a candidate for anti-ud. Call this I_1. Let I_1 be

constructed from G_1 <-> g <-> H_1. 51, 53, 55

57 Let us label the circles in I_1 as follows (left to right in 56):

$S_{1,2,3,4}U_{1,2,3,4}T_{1,2,3,4}$ in order Re, Im, Re, ... 56

58 Let the charges be added: Color charge: S_1 and T_1, Electric charge: S_2 and T_2, Mass: S_4 and T_4 in as balance with the left half, like in the following Figure: 57

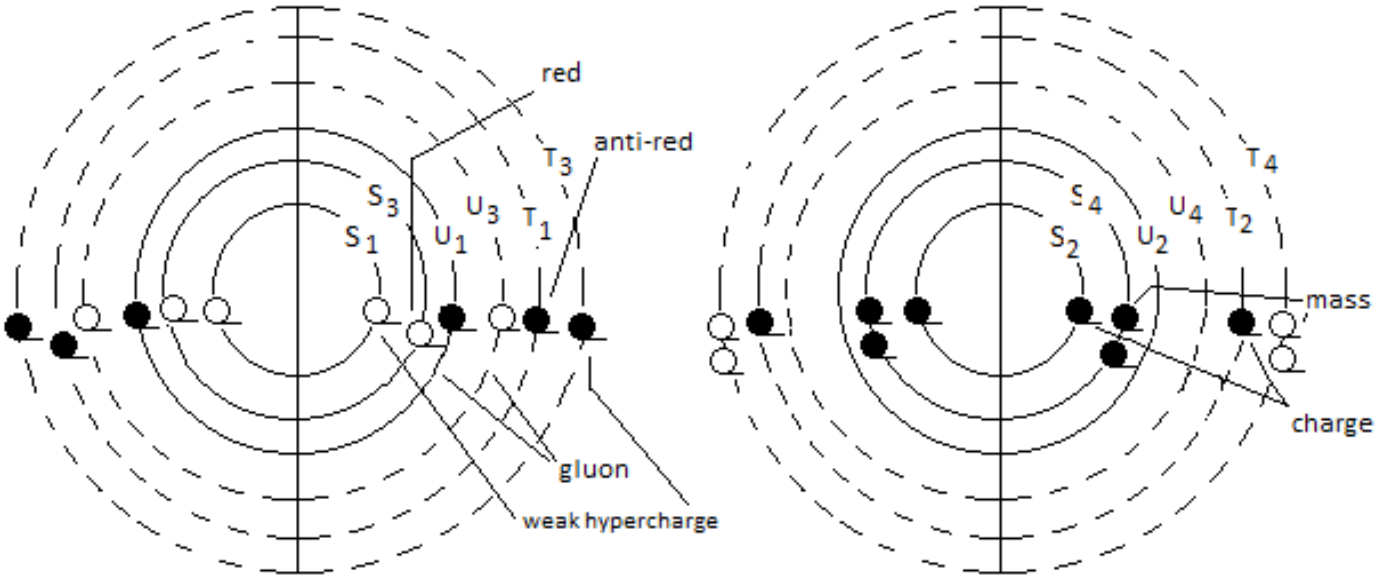

Figure 1.4

They are drawn like this, but really the circles are all superimposed on each other so that one would see only two circles in three dimensions. The little stripes below the little circles and filled circles indicate they are active. Active nodes can influence events of spacetime external to the particle; passive nodes can only do that inside the particle. I_1 must have -2 Weak Hypercharge since it interacts by the Weak Interaction and because of 62 below.

59 Let the charges be balanced by the antiparticle constructed as follows: I_2 is constructed from copies of S, T, U such that I_2 = H_2 <-> g <-> G_2. 51, 53, 55

60 Small circles are defined to be attracted to filled circles of the sme charge type. 58, 59

61 A pi-minus has: electric charge = -1, mass = 139.570 MeV, decays into: electron and electron-antineutrino, interacts via: Strong, Weak, Electromagnetic, Gravity, has spin = 0 and parity = -1 Pi-minus properties see: [1]

62 Define an I_1 to decay to the particles in figure 1.5 and 1.6. Call the particle in figure 1.5 an I_{12} and the one in figure 1.6 an I_{13}. We have that the strong force charge goes inactive in both particles, but they are still needed passively for keeping the particles together. I_1 decay definition.

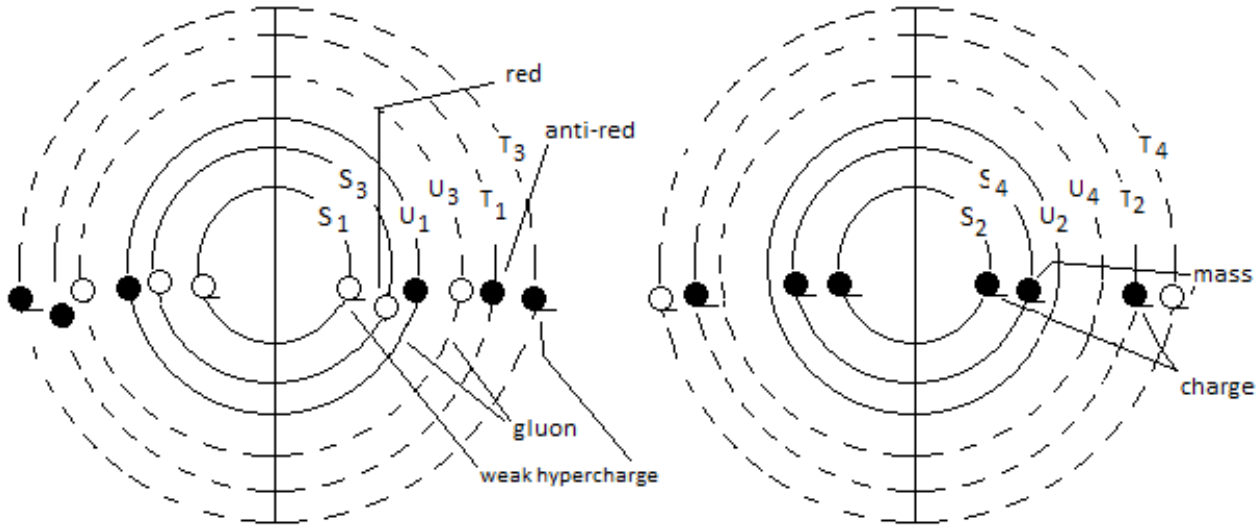

Figure 1.5

We have this decay to a right handed particle.

62.1 Define the particle's mas charge sphere to rotate twice for every revolution of the spin of I_{12}. not bound together

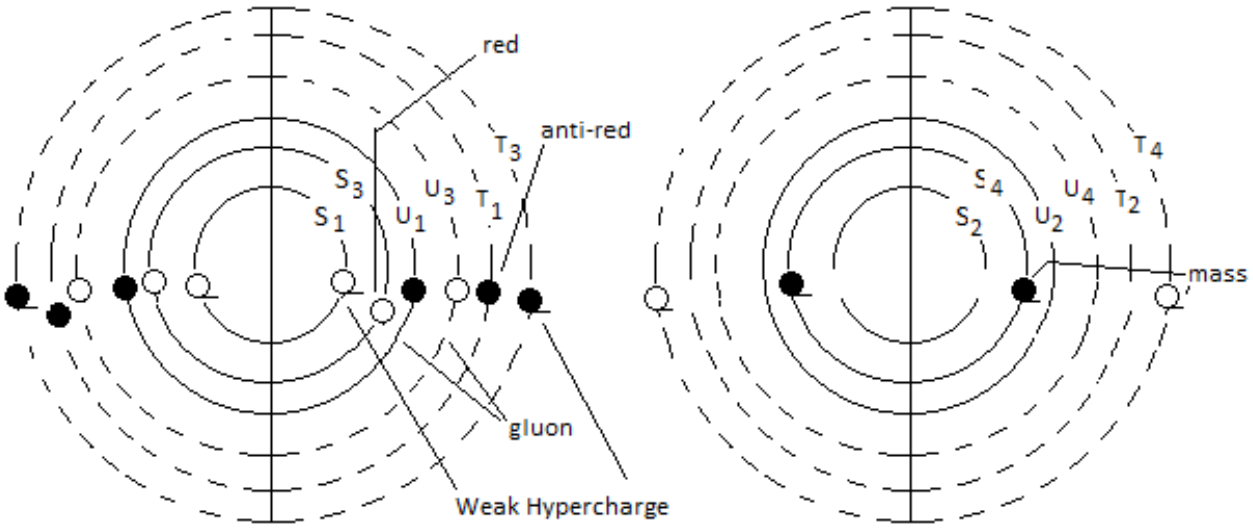

Figure 1.6

Mass charge devides in half. Space must give the I_{13} particle Left Handedness.

62.2 Define the sphere with mass charge to spin twice around for every total rotation of the particle. not bound together

63 I_1 has charge -1. 58

64 I_1 has mass determinable with the Higgs field. Define the mass charge

by its ditance to sensed nodes and use the Higgs mechanism. 58

65 I_1 decays to an electron and electron antineutrino. 62

66 I_1 has Strong, Electromagnetic, Weak and Gravitational interactions 58

67 Spin 0 of I_1 can be accomodated by defining the mass-charge to fill the entire Riemann sphere.

68 I_1 has parity = -1 since invering the axii puts infinity at the bottom. 58

We must prove I_{12} is an electron before symmetry breaking: Decay from I_1 to I_{12} can happen in two ways: rotate the I around the bottom point to produce left handed I_{12}, or rotate around the topmost point (at infinity) to produce right handed I_{12}.

70 I_{12} has weak, electromagnetic and gravitational interactions. 62

71 I_{12} has electric charge = -1. 62

72 I_{12} is stable. 62

This is since there is a gluon holding the particle together.

73 I_{12} has Weak Hypercharge = -1 62

74 I_{12} has spin 1/2 62.1

75 I_{12} is a electron 70 ->74

We must prove I_{13} is an electron antineutrino:

76 I_{13} has spin 1/2 62.2

77 I_{13} has charge = 0 62

78 I_{13} has hypercharge +1 62

79 I_{13} is a left handed electron antineutrino 76 -> 78

80 I_1 = right handed pi-minus (before symmetry breaking). 61,62 -> 68.1, 75, 79

... Define protons

... Define Hydrogen

Comments:

In trying to construct photons by inserting a half circle on Pp one is led (because the half-circle must come from a copy of space) to also construct antiphotons and they are not made of anti-dimensions.

After line 34, we have constructed a photon and an anti-photon and basic spacetime and time. We may postulate that EM comes from 3 dimensions of space x the 5'th dimension.

We have that the theory of defining photons my be tested by proving: there is a direction in which a photon will not go.

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