

Using the IRC n-Tiered model to generate numeric solutions for possible leptons

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Abstract

Our model has 3 tiers below leptons and quarks: proto-matter, mezzo-matter, and infra-matter. Each has characteristic tachyons binding together the lower level structures to produce the higher level. Each class of tachyon generates its own granularity constant. The proto-matter is bound by gravitons to form the leptons and quarks. The mezzo-matter is bound by mezzo-tachyons to form the proto-matter. The infra-matter is bound by infra-tachyons to form the mezzo-matter. 2 types of mezzo tachyons bind the mezzo-matter structures: a charge tachyon binding s mezzo-matter (with $l=0$), and a color tachyon binding structures with $l>0$. The s structure has 1 infra-tachyon and 1 infra-photon, in 1s orbits. The p structure has 7 of each: among 4 s sub-shells and 1 p. The d structure has 11 s sub-shells, 3 p, and 1 d. Etc. Based on the first 2 leptons, a solution for the energy of the s (charge) structure, and the p (color) structure were deduced, from which the other mezzo structures energies were generated. From the mezzo matter energy content, and a pattern of orbits at the proto-matter level, energies for the next few leptons were found (to 3 sig figs): 140 MeV, 827 MeV, 1780 MeV, and 4690 MeV.

Assumptions

- 1) All Tardyons (any object moving slower than the speed of light) are structures, and all structures are tardyons. Structure as used here means anything that can be treated as a unit, but that has constituents.
- 2) The fundamental forces of electro-magnetism, gravity, and the strong force are the result of wave on wave refraction. This slows the wave causing an attraction for the tardyons, and a repulsion for the tachyons.
- 3) Tachyons become trapped in structures when $L_v > \lambda$. The L_v in question is the length from the tachyon's perspective of the orbiting tardyons with $L_v \sim L_0 V/c$.

- 4) Centripetal force is $2E_k/r$ for all types. Where V is small, this reduces to mV^2/r .
- 5) The granularity constant h relates the total energy of a photon to its frequency. The standard form $E=hf$ only applies for the photon. The individual pieces follow a more general law $E=hc/\lambda P^*$, where λ is the wavelength, and P^* is the number of energy equivalent pieces in a photon (12). This E is the kinetic energy. This form holds for the immediate constituents of each of the elementary particles. Similarly, angular momentum comes in quanta of $L = \hbar/12c$.
- 6) This granularity constant is generated by the gravitons within the structure.
- 7) Other granularity constants are generated by other tachyons.
- 8) Kepler's laws are only applicable in a Newtonian framework. Where V is large, a more general form using energy is required. For an electron in isolation near a charge, the stable 1s orbit occurs where $r = a_0/z$, where z is the ratio of the charge on the structure to the charge on a proton, a_0 is Bohr's radius, and r is the distance between the centers of mass of the structure and the electron. The Kinetic Energy of the orbits of the charged structure and the electron total $z^2 E_1$ where E_1 is the energy for $z=1$. Velocity is derived, not proportionate to z . For many cases z is a net charge, often symbolized as z^* .
- 9) The infra-matter luxons in s orbits are synchronized to the gravitons, having 1 orbital cycle in the time a graviton has P (a rational >3).
- 10) The electrons have eccentric orbits, aside from the s, with focal length f proportionate to l number. P ($l=1$) has f of 1s radius $/\sqrt{2}$ so 2p has eccentricity e of $\sqrt{2}/4$, 3p has e of $\sqrt{2}/6$, etc. D ($l=2$) has twice the focal length of P , so 3d has e of $\sqrt{2}/3$. Similarly, the proto-matter and infra-matter have orbits with eccentricity of $e = \frac{l\sqrt{2}}{2n}$.

Introduction

The IRC model has multiple layers of structure for all the “fundamental” sub-atomic particles, including the quarks, photon, and leptons. Each contains proto-matter trapping gravitons. The proto-matter in turn are each structures, comprised

either of mezzo-matter or of infra-matter. Mezzo-matter structures trap mezzo tachyons forming proto-matter, and are comprised of infra-matter. Infra-matter is treated as final: not a structure, but a luxon with no rest energy. Infra-matter traps infra-tachyons forming mezzo-matter.

The proto-matter can be described as members of 3 classes: proto-bosons, proto-quarks, and proto-leptons. The proto-bosons (proto-photons and proto-gluons) are attracted to structures with net charge and net color respectively. Proto-photons can also form particles without other proto-matter, either cancelling out their angular momentum to form photons, or with residual angular momentum forming neutrinos.

Proto-quarks have net charge (either 1 or 2 units), and net color (1 unit). They have been arbitrarily defined as normal matter and anti-matter in keeping with historic usage. Proto-quarks routinely are found clumped together, forming structures containing 2 or more proto-quarks. The simplest contain 2 quarks in a single circular structure with a normal matter and an anti-matter proto-quark sharing s orbits above a pair of 1s gravitons. These diquarks are the scalar mesons. Alternately, 2 adjacent ellipsoidal structures can form, each containing 1 or 2 proto-quarks above a pair of gravitons, and a proto-gluon above another pair of gravitons, in elliptical orbits perpendicular to the circular s orbits the proto-quarks occupy. If a structure has net charge, there are $3|z|$ proto-photons in circular s orbits around the structure. A charged diquark, such as a π^+ would have the 3 proto-photons in the same ring of orbits as the proto-quarks, typically 3s and 4s. A charged mono-quark pair or a charged mono-quark diquark combination would have an additional ring containing a pair of gravitons and $3|z|$ proto-photons. These combinations of monoquarks and diquarks can further clump together, as in the atomic nuclei. A third form is possible, with a trio of proto-quarks in circular orbit above a pair of gravitons. These tri-quarks can be neutral or charged. We are naming them “negrons” or dark matter particles. The lightest should be about 127 MeV. A pair of monoquarks clinging together are the vector mesons, while a monoquark clinging to a diquark form the baryons. The delta may be a trio of monoquarks clinging together, or an up/up diquark clinging to either an up or down for the + and ++ cases, or a down/down diquark clinging to either an up or a down for the 0 and - cases.

In contrast with the proto-quarks, the proto-leptons have 3 units of charge, no net color, and form single circle structures that move independently. They may orbit other charged structures, but are discreet from them and easily detached.

Mezzo Matter

As with any simple series, there are in theory an infinite number of mezzo matter structures possible. In practice, only a few of them are required. It was found that mezzo matter forms simple structures for each possible value of l . The $l=0$ structure is associated with charge tachyons. It has a single infra-photon trapping an infra-tachyon, each in 1s orbits about 10^{-60} m in diameter. These orbits are circular and lay on the x/y plain. The charge tachyons are trapped in orbits about 10^{-35} m in diameter. They are orbiting at around 10^{25} c, and produce 7/3 small units of angular momentum, where a small unit is $L = \hbar/12c$. As with the contents of the charge or s mezzo-matter structures the charge tachyons have circular orbits on the x/y plain. Their frequency is on the order of 10^{68} cycles per second. As with any low-energy tachyon, the frequency is only weakly a function of energy, with $v_v = v_\infty * (1 + c^2/2V^2 + c^4/6v^4 + \dots)$, where $E_v = E_0ic/V$. Since energy and velocity are inversely related, angular momentum for an ns tachyon is independent of n, being purely a function of r: $E|n=nE|1$, $L = E_v V r / c^2 = E_0 i r / c$.

For $l=1$, the p or color mezzo-matter structure has 4 s sub-shells, and 1 p sub-shell. Each is $\frac{1}{2}$ infra-photons and $\frac{1}{2}$ infra-tachyons. The orbits are about 10^{-62} m in diameter, with the p orbits elliptical with a maximum diameter $\sqrt{2}$ * the minimum diameter. The structures trap color tachyons in elliptical orbits perpendicular to the x/y plain, in one of the three color or p plains. The color tachyons have orbits similar in size to the corresponding s orbits occupied by the charge tachyons. As the 3 vectors of angular momentum within the p structure are 60° apart, they add to net color (a trivial amount as compared to the color tachyons contribution). That means there are 6 variants on the color mezzo-matter structure. Similarly, the color tachyons have 3 vectors of angular momentum that can add in two stable ways: either 120° apart, producing 0 when all three are maxima simultaneously, or 60° apart producing constant net angular momentum twice the average amount

when the central vector is at its maximum when the 2 outer vectors are at their minimum.

For $l=2$, the d mezzo-matter structure has 11 s sub-shells, 3 p sub-shells, and 1 d sub-shell. As with all $l>0$ cases, the highest l orbit is in the plane of the color tachyon it traps. d defines 5 planes, while f defines 7, g 9, etc.

For $l=3$, the f mezzo-matter structure has 22 s sub-shells, 7 p sub-shells, 3 d sub-shells, and 1 f sub-shell.

With $l=4$, the g has 37 s sub-shells, 12 p sub-shells, 6 d sub-shells, 3 f sub-shells, and 1 g sub-shell. There is again the possibility of net angular momentum lacking in the d and f cases. There are then potentially 18 flavors of the structure, with trivial angular momentum in any of the relevant directions along the x/y plain. Since the p or color structure has a simpler structure, and aligns on 3 of the 9 plains, it is assumed the filled subshell within the proto-matter contains 9 color tachyons, 6 g mezzo structures, and 3 p mezzo structures. If this is in error the middle and top proto-quarks are heavier than projected. Similarly, the 9 color tachyons can form 3 sets of 3 either 60° or 120° apart. This gives 3 independent vectors with 7 possible values, or 343 total “hues”.

Analysis was done through $l=22$, but that is just silly. Cases with $l=3m+1$ (where m is a positive integer) have hue, with 7^{2m+1} variants.

The following summarizes the relevant Mezzo-matter structures:

l	s	Name	RE/bit (MeV)
0	1	s	0.010298491
1	4	p	5.827058961
2	11	d	42.76491689
3	22	f	184.953471
4	37	g	549.3242684
5	56	h	1293.188076
6	79	i	2681.970947
7	106	j	5020.313483
8	137	k	8599.588051
9	172	l	13,944.75884

10	211	m	21,565.32136
11	254	n	31,566.53609
12	301	o	45,288.37989
13	352	q	62,967.10472
14	407	r	85,455.60517
15	466	t	113,767.0686
16	529	u	148,362.9023
17	596	v	190,886.1597
18	667	w	241,586.1990
19	742	x	302,380.0282
20	821	y	374,223.8960
21	904	z	458,777.3731
22	991	a	556,597.4937

Proto-Matter

Just as the mezzo-matter has structures with a series of sub-shells, the proto-matter structures have a parallel set of sub-shells. In most cases the sub-shells contain mezzo-matter, but in 2 special cases they contain infra-matter. These are the proto-photon, which looks like an s mezzo-matter structure, and the proto-gluon which looks like a p mezzo-matter structure. Since net angular momentum can't occur at d or f, no proto-matter resembling those structures is expected, but additional proto-matter resembling the g, j, m, etc. mezzo-matter should also occur. Proto-matter containing infra-matter clings to structures with angular momentum opposing them. Thus the proto-photon with trivial angular momentum in the charge direction clings to charged structures with opposing charge. Proto-gluons with trivial amounts of color in 1 of the 6 color directions cling to structures with the opposing color.

Most proto-matter is comprised of mezzo-matter and mezzo-tachyons. The variety of mezzo-tachyon relates to the variety of mezzo-matter, with the charge tachyon only trapped by the charge structure, while the color tachyon is trapped by any of the other mezzo-matter structures (including the p or color structure).

As with the mezzo-matter, the order of orbit filling follows a simple progression: the first p sub-shell fills after the third s, about the same time as the fourth s.

Unlike the electron orbits, in the proto-matter and mezzo matter structures, $n=l$ is a valid case. The first d sub-shell, 2d, fills between 10s and 11s. The first f sub-

shell, 3f, fills between 21s and 22s. 4g after 36s, 5h after 55s, etc.. In each case, the third sub-shell for a lower l fills shortly before the first of the next l out.

Aside from the special cases where infra-matter is involved, all of the other proto-matter falls into 2 families: proto-quarks and proto-leptons. Proto-quarks have either 1 or 2 full sub-shells at the highest l level, and the s sub-shell just beyond. Proto-leptons have 1 fewer s sub-shell if the corresponding proto-quark has an even number of s sub-shells; and 2 fewer if the proto-quark has an even number of s sub-shells. In each case, an odd number of sub-shells corresponds to an odd amount of charge $1/3$ or $3/3$, and an even number of sub-shells corresponds to an even charge of $2/3$. Proto-quarks have charges of $1/3$ or $2/3$, while proto-leptons have a charge of $3/3$. Each of the proto-quarks examined to date have 1 net unit of color, and each proto-quark has 0 net units of color. Other than the proto-up, the proto-quarks have the capability to have 2 or more units of color, but that has not been reported.

The following summarizes the relevant kinds of proto-matter:

Highest Mezzo s	Name	Bottom Up Energy (MeV)	Top Down Energy (MeV)	% Error
1	p-Lepton 0	0.01411493		
2	p-Quark 0	0.03012771		
3	p-Electron	0.04820745	0.04820745	NA
4	p-Up	17.96143	17.96143	NA
5	p-Muon	17.98440	17.98440	NA
7	p-Down	36.53400	36.53400	NA
9	p-Lepton 3	36.59463		
11	p-Strange	270.5712	270.7225	0.056%
15	p-Lepton 4	290.1727		
16	p-Charm	526.0174	525.873	0.027%
21	p-Tauon	763.3565	763.2181	0.018%
22	p-Quark 5	2081.021	2080.57	0.022%
27	p-Lepton 6	2320.103		
29	p-Bottom	3640.132		
35	p-Lepton 7	3903.593		
37	p-Quark 7	8762.298		
45	p-Lepton 8	10,330.85		
46	p-Top	13,894.72		

Top down energy is calculated from the relevant elementary particles: known leptons and scalar mesons. As the proto-electron and proto-muon were used as a basis for all other calculations, there is no error calculation possible. Proto-up energy was calculated from the calculated energy of the relevant 5s sub-shell which is the only difference in energy between a proto-up and a proto-muon. Proto-down was calculated from the reported energy of the neutral pion, and the previously calculated energy of the proto-up. Bottom up calculations were down to include those 4 data points.

Leptons

The proto-leptons form structures trapping pairs of gravitons, and attracting trios of proto-photons. The 6 piece resulting structure is a ring on the x/y plain. All reported charged leptons have net angular momentum of 6 small units. As charge results in 7 small units, there is a net angular momentum on a structural level of 1 unit aligned opposite that of the charge. In each case the gravitons are in 1s orbits.

It was determined that an ns proto-photon has $\pm n$ small units of angular momentum. The sign depends on the orientation of the proto-photon. A formula was found that calculates the velocity of a ns proto-matter piece with m extra units of angular momentum. As the proto-lepton has significant rest energy, it can't move at or very near c. The formula is in terms of a and b where the velocity is $\frac{a}{b}c$. Then $b=a+m$, $a+b = \frac{(2n+m)^2}{m}$. The first proto-lepton, the proto-electron, is in a 2s orbit with 3 small units of angular momentum, so $V = \frac{12}{13}c$.

At that velocity, for every 5 units of rest energy there are 8 units of kinetic energy. The energy equivalent piece total for the electron or P* is 12, with 2 1s gravitons, 2 3s proto-photons, a 2s proto-electron, and a 2s proto-photon. For s orbits the piece equivalent energy is just the sum of the n values for each piece. As a 2s orbit is 8 units of kinetic energy, the total kinetic energy of the proto-matter in the electron is 48 units, so the total energy of the electron is 53 units, with the proto-electron having rest energy at that level of organization of $\frac{5}{53}E_e$. That is, about 48.207445 KeV.

The second proto-lepton, the proto-muon, is in a +3s orbit paired to a -4s proto-photon. $P^* = 13$. Velocity is $\frac{15}{17}c$. Rest energy of the proto-muon is 17.984404 MeV. The third proto-lepton is in a +4s orbit, paired to a -7s proto-photon. $P^* = 17$. Velocity is $\frac{4}{5}c$. The fourth proto-lepton is in a +5s orbit paired to a -11s proto-photon. $P^* = 22$. Velocity is $\frac{120}{169}c$. The fifth proto-lepton is in a +6s orbit in the tauon, paired to a -16s proto-photon. $P^* = 28$. Velocity is $\frac{204}{325}c$. The sixth proto-lepton is in a +7s orbit, paired to a -22s proto-photon. $P^* = 35$. Velocity is $\frac{161}{289}c$.

As with any infinite series, a zeroeth element can be calculated. This is not likely to have a physical reality. The zeroeth proto-quark has 2 s sub-shells of mezzomatter, and the zeroeth proto-lepton has 1. The zeroeth proto-lepton would occupy a 1s orbit, paired to a 1s proto-photon, with the 2 graviton in 2s orbits, and no additional proto-photons. $P^* = 6$, Velocity is $\frac{4}{5}c$.

The following summarizes information about the charged leptons:

Number	Name	Rest E (MeV) Theory	Rest E (MeV) Measured	Proto-RE	P^*	1s Proto- Matter Energy	Gross r (fm)	Effective r (fm)
0		0.070575		0.0141149	6	0.0094100	1747.5	1398.0
1	Electron	0.510999	0.510998918	0.048207445	12	0.038566	426.38	386.159
2	Muon	105.658	105.6583715	17.98440366	13	6.7442	2.4382	2.0232
3		140.279		36.595	17	6.0991	2.6961	1.9928
4		826.626		290.173	22	24.384	0.67437	0.43764
5	Tauon	1777.14	1776.82	763.357	28	36.207	0.45417	0.25908
6		4688.54		2320.10	35	67.670	0.24300	0.12275
7		7421.31		3903.59	43	81.807	0.20101	0.09528
8		18,136.4		10,330.85	52	150.11	0.10955	0.04715