

## Elementary Particles - relative radius ratios - a predictive measure of their relative masses

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### Abstract

From the standard definitions of volume of a sphere & density of a solid:-

$(\text{cube root} [\text{mass}/\text{density}]) = (\text{cube root} [\text{volume}])$  & is proportional to radius.

If density is almost constant,

$\text{cube root} [\text{mass}/d] =$  is proportional to radius, where  $d$  is constant.

Ratios of different (cube root [mass/d]) ratios are now equivalent to ratios of different radii!

[cube root of the mass], equivalent to a radius parameter, is quantized & the radius ratios form consistent patterns for the different levels of matter.

The cube root of the masses of the fundamental particles become calculable relative to the cube root of the mass of the electron! [The cube of the values then give the masses (MeV).]

[Note:- The "standard letters" for the fundamental particles below are not for the particles themselves but one of their properties i.e. (cube root of the mass of relative to the electron)]

$4*(e1=e/4) + u\{=10*e1\} = d\{=14*e1\}$ , where  $e1 = (\text{cube root of the mass of the electron})/4$

$8*(e2 = [mU]) + s\{=6*e2\} = c\{=14*e2\}$ , where  $e2 = 6*e1$

$10*(e3 = [tU]) + b\{=4*e3\} = t\{=14*e3\}$ , where  $e3 = 14*e1$

Also:- Higgs boson = 50:  $w[+-]$  boson = 43:  $(3*14 = 42)$   $z[0]$  boson = 45:

### Theory

This was largely based on a section of my original paper: vixra: 1311.0196: Sphere Geometry of Forces & Fundamental Particles of the Universe [S. C. Gaudie -email: tetrahedron\_1\_3\_6{at}aol.co.uk.]. The section has been much modified, clarified & expanded!

"Mass" is quantized, not in terms of mass itself, but in terms of the cube root of the mass {crm}!

[Suggested basic unit (cube root of the mass of the electron)/4.] This means that mass, at the

fundamental particle level, seems to be arranged in spheres of the same mass-energy density!

Fundamentally, particle mass can be viewed as being in discrete, "quantum size dictated" spheres [with a "four dimensional tetrahedral stacking component"!

Mass, as the current descriptor of matter, has an implied density component. The cube root of the mass (radius) also has an implied density component, but is also "quantized", calculable & quantifiable [through the relative ratios] basis.

A black hole's mass is defined by its radius &, similarly, for any fundamental particles, its mass is defined by its radius [cube root of the mass]! This redefines the fundamentals of mass as "brown holes" or "mass holes" or "quantum masses"!

The cube root of the mass radius for an electron [with accurately defined charge & mass values] can be used to inter-relate mass & length!

A proxy model of the mass radius ratios can be cannon balls stacked in a triangular tetrahedron. This is extended to two tetrahedrons stuck together base to base. The numbers for the layers are below in the Data -Appendix.

The proxy model of the cube root of the mass (radius) implies a four dimensional spherical nature to matter. The "tetrahedron structure arrangement" [of the discrete, "quantum size dictated" spheres] would be in the fourth space dimension. The cube root of the mass (radius), as a linear "description of matter", [with or without a non-dimensional vector, component] also, easily fits into the "origami" nature of the "two dimensional, holographic universe".

The different levels of matter have mesons & quarks with similar {crm} ratios within the level, when compared to other levels!

The patterns found indicate a possibility of a fourth level of matter! It would be at a much higher energy & much shorter lived!

As the energy from the big bang "cooled" & phase-transformed into matter, it would pass through the different levels of matter, from the highest level towards the lowest level! [Each "phase change" could lead to inflation!] There could have been a single "universe particle" created [at a much higher level of matter] initially when energy first turned into matter. This would have been like a soap bubble in air, isolated from its "environment". There could be "almost innumerable" "identical twins" of isolated, matter & anti-matter universes, "condensed out" of the "super-energy pre-universe". If "our", single "universe particle" was matter, almost all "radioactive decays" within it would produce matter! No need for the "anti-matter problem"! Whether, another, single, "universe particle" of anti-matter in another universe was created simultaneously or not is irrelevant [& most likely forever undetectable!] [unless it has a "dark matter" influence]! The "unconfined energy" needed to produce a "predetermined universe size" when the "universe particle" was created. This would be the initial inflation for the universe, to accommodate the particle's "mass sphere"! The structure of the universe would then be determined from the "decay of

particles” within the universe. There is a hint of “fission-track” structure of multiple decays within the largest structures of the universe!

[See @ about 40 seconds in:- Laniakea: Our home supercluster:- <https://www.youtube.com/watch?v=rENyyRwxpHo> ]

The ratios also suggest that the values here for the cube root of the mass radius ratio relative to electron for the third level of matter are too high. Substituting a value of 14 instead of 15 would keep an “internal consistency”.

This would give recalculated values (MeV) of:-

tU= 1444 [1777]; t= 140710 [173070]; b= 3400 [4180] [=“std” values]

A positive or negative “binding energy factor” may be required on moving to another level.

The tet integers for the mesons 2, 6 & 12 don’t appear in this data. Let’s call the associated matter “shadow matter”. We can detect “normal” matter at levels “1, 2 & 3” [with tet integers for the mesons 4, 8 & 10] so, there is no reason to suppose that, if these levels of “shadow matter” existed, they would remain undetected. The “all possibilities exist in the universe” view might suggest “shadow matter” as “dark matter” or “shadow matter” might have positive mesons & negative quarks! The mesons values, 2, 6 & 12, cannot be obtained by cumulative counting, in complete layers, from a (or two) tetrahedral peak(s), but 4, 8 & 10 can!

For the possible fourth level of matter, the increasing size of the “electron equivalent” meson, relative to the largest quark value on a given level, suggests that at the fourth level of matter, the meson is too large to exist with two different sized quarks. However, there is an intriguing possibility. On going from level 1 to level 2, the tet integers for the mesons increase by 4. So, if, on going from level 3 to level 4, the tet integers for the mesons increase by 4 we arrive at 14.

The tet integers for the mesons of 14 is a special case, as the quark(s) & meson have the same energy. then our fourth level of matter must have only one type of quark, with no charge on it. This would also mean no charge on the meson, which also means no electric or magnetic [but gravimetric] attraction between the fundamental particles. Do the quark & meson flip between each other? There is “logical beauty” in the creation of the “first matter” [from energy] with mesons & quarks with the same value. As the big bang energy transformed into 4th level matter [on way to “our matter”], the creation of matter & the fact that the matter has no electric or magnetic attraction would both lead to enhanced inflation. The much higher densities then, probably meant that the 4th level of matter was more stable in the very early universe. Matter would be an un-ionised. The matter distribution variations of our universe now, would be greatly influenced by statistical variations in the density of this neutral mix of 4th level matter mesons & quarks!

The special case, of the quark(s) & meson having the same energy & no charges could be a candidate for “dark matter”, but the very quick decay times and having it as very early matter seems much more logical.

Our universe would be the product of the decay of 4th, 3rd & 2nd level matter!

[NOTE:- We have :-

equal nos for + & - charges

equal nos for north & south poles

“almost all normal” for matter [tiny amounts of man-made anti-matter]

“all normal” for charge [no anti-charge particles known]

“+ value” only for mass [no negative mass]

“+ value” only for time [time moves in only one direction]

“+ value” only for entropy [entropy moves in only one direction]]

## **Data -Appendix**

### **Tetrahedral Sphere Stacking**

[Two tetrahedrons stuck base to base]

The individual numbers in each layer:-

1; 3; 6; 3; 1;

The cumulative numbers in each layer:-

1; 4; 10; 13; 14;

4; 6; 4;

Special case for Higgs Boson

The cumulative numbers in each layer:-

1; 4; 10; = ONE 4-sided tetrahedron.

ONE 4-sided tetrahedron stuck on to each of the 4-sides = total number 50

Data from:-

[http://en.wikipedia.org/wiki/File:Standard\\_Model\\_of\\_Elementary\\_Particles.svg](http://en.wikipedia.org/wiki/File:Standard_Model_of_Elementary_Particles.svg)

Masses [Mev]

e 0.51:

u 2.3:

d 4.8:

mu 105: s 95: c 1275:  
 tu 1775: b 4180: t 173070:  
 w[+-] 80400: z[0] 91200:  
 Higgs Boson 125000

Relative radius ratio [cube root of mass (Mev)] relative to electron

|                |         |          |          |                   |                   |
|----------------|---------|----------|----------|-------------------|-------------------|
| e 1.0:         | u 1.65: | d 2.11:  | ratios:- | s 1.65/1 =1.65    | c 2.11/1 =2.11    |
| mu 5.9:        | s 5.7:  | c 13.5:  | ratios:- | s 5.7/5.9 =0.97   | c 13.5/5.9 =2.29  |
| tu 15.1:       | b 20.1: | t 69.7:  | ratios:- | b 20.1/15.1 =1.33 | t 69.7/15.1 =4.60 |
| w[+-] 43:      |         | z[0] 45: |          |                   |                   |
| Higgs Boson 50 |         |          |          |                   |                   |

Relative radius ratio [cube root of mass (Mev)] relative to electron

e = 1.0: mu = 5.9: tu = 15.1  
 e = [1]: mu = [6]: tu = [15]

**FIRST** level - normal-charge - "Our normal matter"

e + \$u{+} = fd{-}  
 [1] + [1]\*(1.65) :: [1]\*(2.11)  
 [1]\*(0.3\*2) + [1]\*(0.3\*5) = [1]\*(0.3\*7)  
 tet{e} 2 + 5 = 7  
 tet{e} 4 + 10 = 14

**SECOND** level - "anti-charge" (\*)

#mU\* + \$s\*{+} = fc\*{-}  
 [6] + [6]\*(0.97) :: [6]\*(2.29)  
 [6]\*(0.3\*4) + [6]\*(0.3\*3) = [6]\*(0.3\*7)  
 tet{mU} 4 + 3 = 7 or,  
 tet{mU} 8 + 6 = 14

**THIRD** level - "anti-charge" (\*)

#tU\* + \$b\*{+} = ft\*{-}  
 [15] + [15]\*(1.3) :: [15]\*(4.6)  
 [15]\*(0.3\*10) + [15]\*(0.3\*4) = [15]\*(0.3\*14)  
 tet{tU} 10 + 4 = 14

Possible:-

**FOURTH** level - normal-charge

3\*yw + xi\*{+} = zi\*{-}  
 tet{yw} 4 + 3 = 7 or,  
 tet{yw} 8 + 6 = 14 or,  
 tet{yw} 14 + 0 = 14!

"anti-charge" (\*) means the anti-particles [with opposite charge] are used for the masses.

REFERENCES

Original source material

[http://vixra.org/author/s\\_c\\_gaudie](http://vixra.org/author/s_c_gaudie); item: vixra: 1311.0196 Sphere Geometry of Forces & Fundamental Particles of the Universe [S. C. Gaudie -email: tetrahedron\_1\_3\_6{at}aol.co.uk

Data source

[http://en.wikipedia.org/wiki/File:Standard\\_Model\\_of\\_Elementary\\_Particles.svg](http://en.wikipedia.org/wiki/File:Standard_Model_of_Elementary_Particles.svg)

Possible speculation

Laniakea: Our home supercluster:- <https://www.youtube.com/watch?v=rENyyRwxpHo>