

A Universe With Three Fundamental Charges

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Hypothesis 1: Six Directions

If we have a system of charges of equal magnitudes of each of the three fundamental types, then, another charge q (irrespective of type), positioned from our system far enough that the separations between the charges in our system is negligible, will neither be attracted nor be repelled by our system. As usual, this kind of electrically neutral system is obtained when we combine equal magnitudes of each of the three fundamental types of charges, which results in the charges "cancelling each other out", that is, if \mathbf{a} , \mathbf{v} , and \mathbf{d} and denote the three types of charges, then, the following identities must be satisfied:

$$|\mathbf{a} + \mathbf{v} + \mathbf{d}| = 0$$

$$|\mathbf{a}| = |\mathbf{v}| = |\mathbf{d}| = 1$$

The second condition indicates that \mathbf{a} , \mathbf{b} , and \mathbf{c} are the position vectors of three distinct points on the unit circle. The simplest solution seems to be the cube roots of unity, so, let -

$$\mathbf{a} = (1, 0), \mathbf{v} = \left(-\frac{1}{2}, +\frac{\sqrt{3}}{2}\right), \text{ and } \mathbf{d} = \left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$$

It follows that the conjugates of the fundamental charges exist as well, and can be mathematically described as pairwise sums of the other two charges.

$$\bar{a} = (-1, 0) = v + d$$

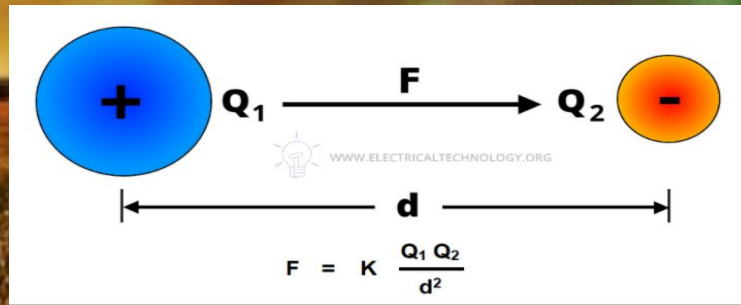
$$\bar{d} = \left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right) = a + v$$

$$\bar{v} = \left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right) = d + a.$$

Now, any charge q will be described by its magnitude ne , for some $n \in \mathbb{N}$, where $e = 1.6 \times 10^{-19} \text{ C}$ and one of the six aforementioned directions.

Coulomb's Law still governs the magnitude of electrostatic force between two charges q_1 (at r_1) and q_2 (at r_2):

$$|\vec{F}_{12}| = \frac{|q_1| * |q_2|}{4\pi\epsilon_0 |\vec{r}_2 - \vec{r}_1|^2}$$



The direction of the force F_{12} (whether is it parallel or antiparallel to \hat{r}_{12}) can be inferred from the following table (+ for repulsion, - for attraction, 0 for zero net force).

Charge Type	a	v	d	\overline{a}	\overline{v}	\overline{d}
a	+	-	-	-	0	0
v	-	+	-	0	-	0
d	-	-	+	0	0	-
\overline{a}	-	0	0	+	-	-
\overline{v}	0	-	0	-	+	-
\overline{d}	0	0	-	-	-	+

The Zeroes

For example, consider the interaction between an \bar{a} type charge at the origin and a test charge of v type. According to our hypothesis, there will be no electrostatic interaction between these charges and here's one way to think about that:

Since an \bar{a} type charge can be thought of as the “sum” of equal magnitudes of a v and a d type charges with negligible distance between them, the force exerted by this system on the test charge will be zero, as v repels (test) v and d attracts (test) v with equal magnitudes and superposition of these two forces would be zero. This means that 3D space is an equipotential volume for the test charge, which is unprecedented!

Hypothesis 2: Cions and Vuons

The reaction behaviour and decay of subatomic particles offer us insightful information on the interior structure of that subatomic particle and mediators.

So this motivated us to consider perspective of annihilation of an electron with its antiparticle the positron. (Inspired by the Weakton model)

According to existing literature, electron-positron annihilation into photons or quark-antiquark pair clearly shows that there must be interior structure of electrons, and the constituents of an electron play a fundamental role in the making of photon or the quark in the hadrons formed in the process.

So we hypothesize that the electron is primarily composed of two charged particles, the Cion (which has charge e_d) and the Vuon (which has charge e_v).

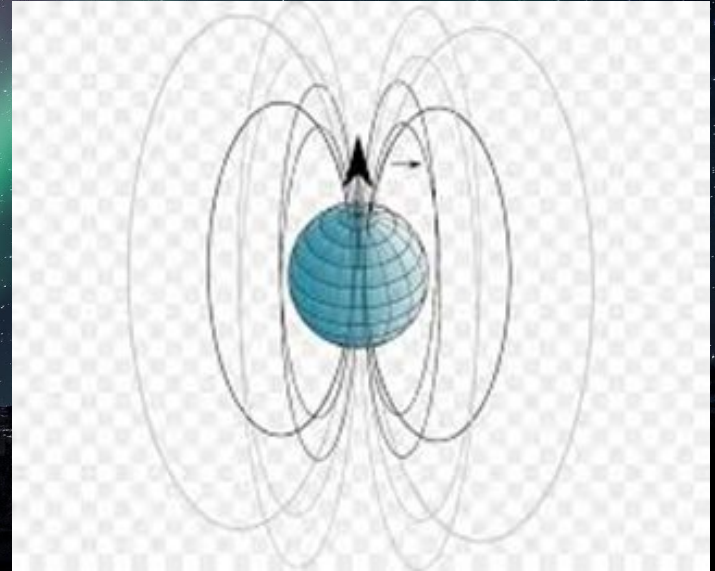
$$\mathbf{d} + \mathbf{v} = (-1,0) \text{ [which is the charge of the electron, that is, } -\mathbf{a}]$$

Magnetic Interaction of Cions and Vuons

- Cions and Vuons interact with their milieu and with the magnetic field produced by a metallic solid spherical ball (we call it the *GYROBALL*), analogous to a dynamo's interior mechanism (with cions circulating inside it just like a stream of cion plasma which creates its own magnetic field)
- The outer atoms of our gyrobball are made such that they react with any cions in the vicinity just like charged electrons interact with Earth's atmosphere.
- Cions and Vuons are considered to be inside an electron and now we will be colliding the electron with positron they annihilate and we observe the smaller cions and vuons in the surrounding space.

Experimental Framework

- In a chamber containing ionised Oxygen-Neon, we impart the gyroball into action.
- The ionised Oxygen-Neon is present to detect the vuons which do not interact with the magnetic field produced by our gyroball. The gyroball doesn't interact with the ionised Oxygen-Neon gas mixture.
- Vuons will interact with the highly ionised Oxygen-Neon gas mixture which will cause them to give off some luminescence.
- The gyroball will generate the cion's magnetic fields, which envelope the gyrosphere as shown in the diagram.



Source :
https://www.google.co.in/url?sa=i&url=https%3A%2F%2Ffavpng.com%2Fpng_view%2Fkraft-paper-earth-s-magnetic-field-craft-magnets-magnetism-png%2FY80gL4PU&psig=AOvVaw1SzdtNFsjqq1P5glZc_r31&ust=1615696636069000&source=images&cd=vfe&ved=0CAIQjRxfwoTCPjko965rO8CFQAAAAAdAA
AAABAD

- Now the free cions that are left in the milieu interact with the gyroball's field lines and then gets accumulated, this produces a glow effect (after interacting with the plates) which we'll be able to see on the upper and lowermost portion of the gyroball (analogous to the phenomenon of Aurora borealis on Earth.)
- The cions instantly interact with the magnetic field lines and under their influence travel along the curved path upto the poles where they settle on the surface producing the Borealis whose shape and pattern may be given by the Lorentz's Force :

$$F = q(E + u \times B)$$

Where q is the charge of cions, u is incoming cions' velocity and E and B are the electric and magnetic field that are generated by the cions inside the gyrosphere.

References -

<https://www.physicsforums.com/threads/physics-related-to-aurora-borealis-help.671868/#:~:text=T he%20equation%20for%20the%20emission,final%20energies%20of%20the%20atom.>

Working principle of the Gyroball

The gyroball proposal here is to basically allow us detect the cions after the annihilation process. The gyroball is basically a device which has a constant flow of cions inside its body and it functions like a dynamo. The cions' flow generate Magnetic loops (shown in Slide 9) and those magnetic loops in turn shape the flow of cions inside the gyroball, like convection currents.

Now right after the annihilation, cions that are present around will interact with the magnetic field loops and under the influence of those loops, will accumulate upon the gyroball's polar region (both) where they'll create an effect like the auroras upon interacting with the plates on the gyroball, whose shape and pattern may be determined if we have the required parameters.