

The Magnetic Neutrino

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Abstract: The highly undetectable, electrically-invisible, abundantly available Neutrinos are with high likelihood the particles of the light-less Dark Matter, the electrically-invisible Magnetic Energy, and the enigmatic Gravitational Energy.

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1.

The Highly Undetectable Neutrino

The Neutrino was suggested by Pauli in 1934 to ensure energy conservation in the radioactive decay of a neutron into a proton, and an electron,

$$n \rightarrow p + e^{-} + \bar{\nu}_e.$$

But its existence was not confirmed experimentally until 1953.

It was believed to be mass-less by whoever never heard of Einstein's $m = E / c^2$. Then, Transformations between the three kinds of Neutrinos, ν_e , ν_μ , and ν_τ , mandated Neutrino's mass for all except Grand Unification Theories, and the Standard Model that are excused from it.

The mass was believed to be almost zero, until cosmic neutrinos, some of the order of 10^{17} MeV, were detected in a Supernova.

Unlike photons, Neutrinos are Not Radiation Energy quanta of frequency ν , and size $h\nu$.

They are unseen, and difficult to detect.

They carry no electric charges, and their structure, if any, is unknown.

Furthermore, like the proton, and the electron, Neutrinos are stable particles. And they have mass, and Energy.

That makes them prime candidates to be a quanta of Dark matter, and magnetic energy, and gravitational energy.

All along, questions regarding what they are were never asked.

We argue here that, with high likelihood,

- 1) the Universe is closed, Dark matter exists,
and Neutrinos are the only candidates to be its quanta**
- 2) Neutrinos are the quanta of the electrically-invisible
Magnetic Energy,**
- 3) Neutrinos are the quanta of the enigmatic Gravitational
Energy.**

2.

Dark Matter Quanta

The Universe may be

an infinite hyperbolic universe with negative curvature,

or, an infinite flat universe with zero curvature,

or, a finite elliptic universe with positive curvature.

Riemann suggested that the Universe is an unbounded but finite 3-sphere with positive curvature, embedded in a 4-dimensional Euclidean space.

To stay finite forever, such Universe will have to oscillate over time from an exploding point into an expanding sphere, that contracts back into the point.

Riemann expected empirical results to determine the Curvature, and shape of the universe.

Recent measurements confirm that with 93% confidence, the Curvature of the Universe is positive.

That is, the universe is Elliptic with 93% certainty.

This determines the Universe fate:

with 93% certainty, the universe fate is to explode, then contract.

While this is conjectured to be the Universe fate, our argument¹ above is the first proof establishing that conjecture.

To slow and halt the expansion, and then start a contraction, there must be enough matter in the Universe.

¹ ["The Universe is Riemannian 3-Sphere that Curves Positively with 93% Certainty"](#)

But not enough was observed in the visible Universe. Substantial amount of the necessary mass to close the Universe is considered missing.

Perhaps, Black Holes contribution to the Universe mass was under-estimated.

Nevertheless, believing that there is a problem of missing mass, Dark matter was suggested to ensure enough mass that will force the contraction, and keep the Universe oscillating forever.

While Neutrinos have no known structure, and are difficult to detect, they are stable particles with energy, and mass. As such, they are prime candidates, if not the only candidates, for the quanta of dark matter, and dark energy.

There should be enough neutrinos to resolve the missing mass problem of the Universe, to ensure its contraction over time, and support the model of expanding, and contracting Universe.

The Lack of any other known candidate confirms that Neutrinos are the likely quanta of Dark matter

3.

Magnetic Energy Quanta

Electric current I in a coil of wire with radius r , generates a constant magnetic field along the axis of the solenoid,

$$\vec{B} = \frac{\mu_0}{2\pi r} I.$$

Hence, the constant magnetic energy

$$\frac{1}{2\mu_0} \vec{B}^2 = \frac{1}{2} \frac{\mu_0}{4\pi^2 r^2} I^2 = \frac{1}{2 \cdot 10^7 \pi r^2} I^2.$$

The electrons through the coil, encircle the core, accelerate towards the center, and consequently, emit photons γ .

The process looks like that

$$\text{accelerating } e^- \rightarrow \text{photons } \gamma \xrightarrow{?} \text{constant Magnetic } \vec{B}.$$

Electrons accelerating back and forth at frequency ν , in an antenna generate by Faraday law an alternating magnetic and electric fields that propagate as photons of electromagnetic radiation with frequency ν .

It is known that photons may generate a pair of a particle, and its anti-particle in a process such as

$$2\gamma \rightarrow \nu_e + \bar{\nu}_e.$$

It is likely that the neutrino ν_e , and the anti-neutrino $\bar{\nu}_e$ are the quanta of the magnetic energy. And the constant magnetic field $\vec{B}$ is generated in the process

$$\text{accelerating } e^{-} \rightarrow \text{photons } 2\gamma \rightarrow \nu_e + \bar{\nu}_e$$

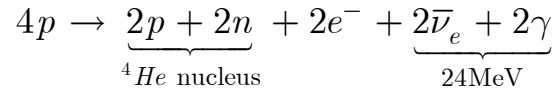
That is, the magnetic field energy which like any energy is made out of quanta, must be made of Neutrinos.

The above argument is supported by known processes, and seems to have no alternative physical explanation.

4.

Gravitational Energy Quanta

At the Sun Core, four Hydrogen protons fuse into Helium's two protons and two neutrons in the process



The 2γ photon's light is visible.

The $2\bar{\nu}_e$ Anti-Neutrinos sweep the earth. The earth showers the Sun back with anti-neutrinos, but unlikely as many as the Suns'. That is, it is likely that the Sun loses more energy. The net loss of energy by the Sun in its orbit will make it fall a little on the earth. On the other hand, The motion of the earth in its orbit generates centripetal force that keeps the distance from the earth to the Sun fixed, and keeps the earth from falling on the Sun.

Thus, the neutrino appears to be the quantum of gravitational energy.

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