Particle-wave dualities until Yotta Hertz eliminated

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Abstract- Yotta Hertz means 10^{24} Hertz. If a neutron would be an electron orbiting a proton at a distance in the range of 10^{-15}-10^{-11} m, it would be able to emit electro-magnetic waves up to these frequencies. The duration of such nuclear photons can go down to tens of zepto (10^{-24}) seconds.

Particle-wave duality of the atomic photon

An electron orbiting an arbitrary atomic nucleus contains kinetic as well as magnetic energy.

> The potential energy does not play a role in such a configuration, because the centripetal Coulomb force applied to the electron is at any moment in balance with the centrifugal force applied to it.

This centuries old misunderstanding of the role of the incorporated potential energy has led to fundamental misconceptions in physics. The most destructive one is that orbiting electrons are thought to create more energy in an atom the *larger* their distance to the nucleus is. The reality is: the *shorter* their distance to the nucleus is.

Excluding the influence of potential energy in an atom, it has been shown in [1] that the energy of a photon is directly delivered by the atom's magnetic energy and indirectly by the kinetic energy of the electron jumping from an inner (i) to an outer (o) orbit. The frequency of the carrier of an atomic photon is calculated as:

$$f = (mq^4Z^2/8\varepsilon_0^2h^3)\cdot(n_i^{-2} - n_o^{-2}) \qquad \text{Hz}$$

Its duration, or pulse width, as

$$plsw = (h^4/\pi^3\kappa^2q^6mZ^2Z_v)\cdot(n_i^{-2}-n_o^{-2})/(n_i^{-6}-n_o^{-6}) \qquad \text{s}$$

with:

Z	atomic number	Z_v	characteristic impedance for vacuum
ε_0	dielectric permittivity	κ	Coulomb's constant
h	Planck's constant	m	mass of electron
q	electric charge of electron		

Such a result eliminates the particle-wave duality of a photon, in favour of the wave.

Particle-wave duality of the neutron-photon

The proposed model of a neutron is in principle equal to the model of a Protium atom (^1_1H). The only difference is the distance between the centre of the proton and its orbiting electron. Just like in case of the atomic photon, the potential energy of the neutron-photon has of course to be ignored too. Considering this distance in the range of 10^{-15} until 10^{-11} m the outcome of the calculated frequency, see reference [2], is now expressed as:

$$\mathbf{E^2 = \eta f}$$

with: $\qquad\qquad \eta = 2\pi^2m\kappa^2q^4/h = 4.5\cdot10^{-51} \qquad \text{J}^2\text{s}$

This result is obtained for the *restricted* situation that the electron jumps far away from its original orbit, so for $n_j \gg n_i$. It turned out that the proposed neutron model does not obey the law for the radii of the orbiting electrons in an atom: $r_n = n^2a_0/Z$, with $a_0 = h^2/4\pi^2\kappa q^2m$. So the radii of the orbiting electrons in the proposed neutron model can be chosen arbitrarily in the range 10^{-15} until 10^{-11} m, with 10^{-15} a distance just larger than the radius of a proton and 10^{-11} a radius just smaller than a_0 ($5.3\cdot10^{-11}$). In case $Z > 1$ this maximum value changes to a_0/Z.

The pulse width of such a neutron-photon is calculated as: $plsw = 2h/\pi Z_vq^2 \cdot f^{-1} = 43.6/f$ seconds. Before it will be claimed that thus the particle-wave duality of a neutron photon has been eliminated too, in favour of the wave, another destructive misunderstanding will be presented.

In modern physics the energy of an alleged elementary particle is, based on the theories of relativity, divided by c^2 in order to interpret the result as the mass of that particle.

It can be shown directly that such an approach leads to an inconsistency regarding the particle called photon in figure 1: on one hand it is generally accepted that its energy equals hf, while on the other hand this energy is zero by applying E =mc^2, because its mass is 0.
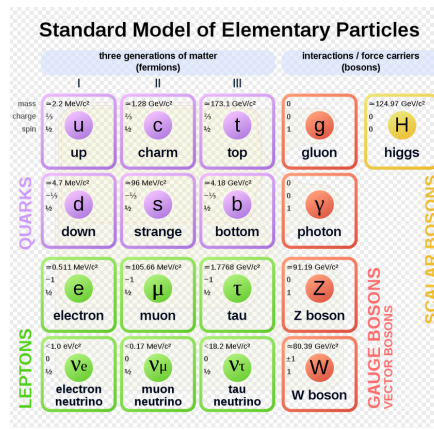

Figure 1: Copied from reference [2].

The transformation of measured energy to mass is done by a new definition of mass unit: eV/c^2. The philosophy behind this definition is as follows. Multiplying a normally defined 1 kg mass with c^2 results in an energy of c^2 = $9 \cdot 10^{16}$ Joule. One J equals $6 \cdot 10^{18}$ eV, so 1 kg = $5.4 \cdot 10^{35}$ eV/c^2 and 1 MeV/c^2 = $1.85 \cdot 10^{-30}$ kg. The table below shows some examples from fig. 1.

Particle	MeV/c^2	kg	Joule	PJ/kg	v/c
electron	0,5	9,3E-31	8,3E-14	90	1,41
up	2,2	4,1E-30	3,7E-13	90	1,41
muon	106	2,0E-28	1,8E-11	90	1,41
charm	1280	2,4E-27	2,1E-10	90	1,41
Z-boson	91190	1,7E-25	1,5E-08	90	1,41
Higgs	125000	2,3E-25	2,1E-08	90	1,41

Table 1 : Some examples of detected elementary particles

In this table column "Joule" shows kg·c^2 and "PJ/kg" de energy densities of the particles in PJ/kg, which are indeed the same for all particles and equal to c^2 = $9 \cdot 10^{16}$ Joule/kg = 90 PetaJoule/kg.

N.B. The maximum theoretical energy density of the alternative neutron can be calculated as $1.2 \cdot 10^{-13}$ J/$1.7 \cdot 10^{-27}$kg = 71 **T**J/kg, realized by the *internal* kinetic energy of the orbiting electron. Particles with only mass don't have an internal energy, so if their energy is measured it can only be their kinetic energy relative to the detector: ½mv^2. Calculating this velocity in Table 1 shows that for all particles v = $\sqrt{2} \cdot c$. The umpteenth evidence that the S- and GTR are invalid.

Conclusions

1   The proposed model of a neutron claims the emission of nuclear photons with high-power electro-magnetic waves of ultra high frequencies and extremely short pulses.

2   The nuclear photons reject the existence of alleged elementary particles, as claimed in modern physics.

3   The determination of the mass of elementary particles, based on the Special and General Theory of Relativity, proves implicitly that these theories are invalid.

References

[1]   https://vixra.org/abs/1505.0225   Why a photon is not a particle
[2]   https://en.wikipedia.org/wiki/Elementary_particle
[3]   https://vixra.org/abs/1803.0036   Atomic Nuclei Modelled Without
                                                          Exotic Particles and Magic Forces