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Photons: Particle or String, Lifetimes - Energy Packaging in Space-Time

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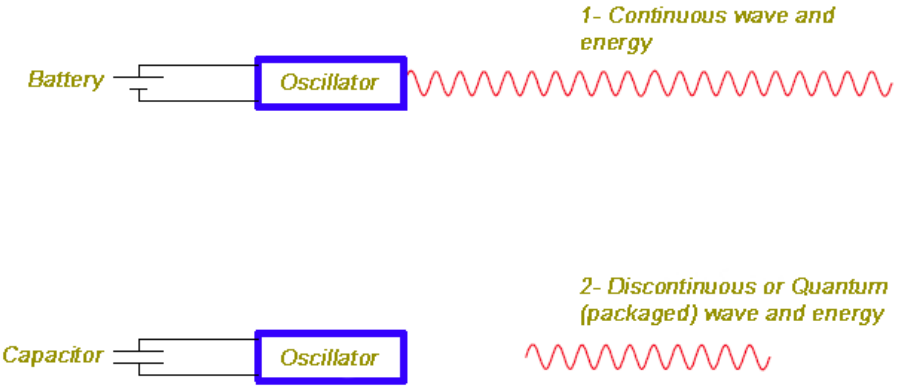
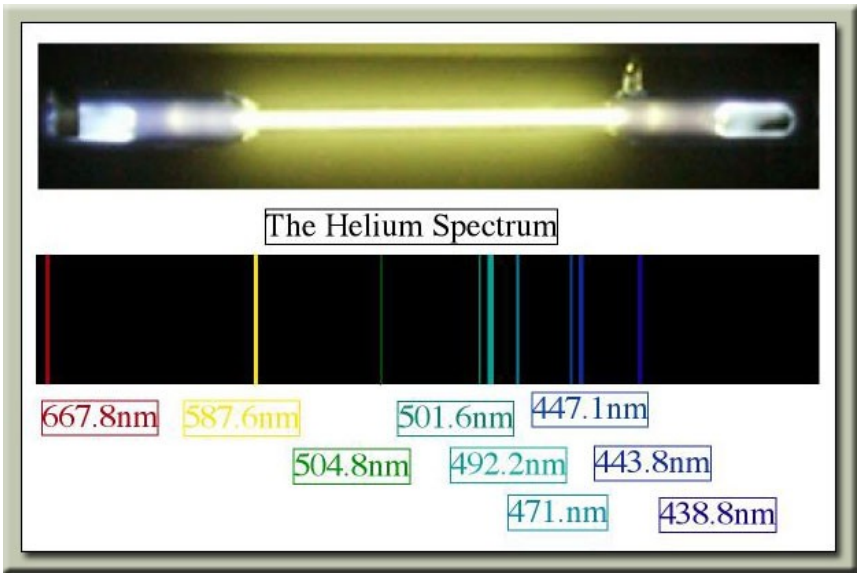
Before beginning, a simple and brief description of continuous or discontinuous (Quantum packaged) waves and energy is given.



In figure 1, the battery supplies the energy and the oscillator runs continuously. Consequently, the oscillator will produce radio waves until the battery charge is depleted. But in figure 2, the capacitor supplies energy periodically. Consequently, the oscillator will produce and emit radio waves discretely and in cross-section, according to the stored energy in the capacitor.

In classical physics, continuous electromagnetic (radio) waves can be easily produced by a power supply and an oscillator circuit, but to produce light (visible spectra) we need to stimulate the orbits of atoms. For this, we can a fill glass tube with pure or special gas, (even metals steam) and we can flow a high-voltage stream, (after decreasing pressure within it,) which is due to a charged electric field in the balance of atoms, or encounter the stream electrons within the circuit of atomic electrons, where the transfer of energy is carried out in time, to make Quantum certainly, because of the limiting balances of the atoms' energy in absorbing and emitting light.



As we know, the exchange of energy between atoms is Quantized or packaged, which is related to wave frequency, given by the famous Planck equation, i.e.:

$$E=hf$$

Where E is the photon energy, f is the frequency of an electromagnetic wave and h is Planck's constant, which has a micro-energy equivalent to $6.626 \times 10^{-34} \, j/s$.

As we know, all trains have one locomotive which provides the force for moving or acceleration of the whole train. Now we use the following formula to calculate the train's momentum:

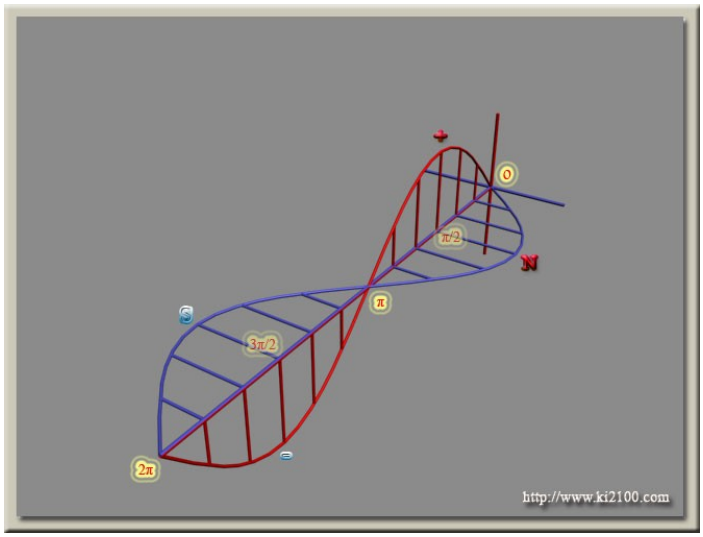
$$P = mv = m_t \times v_t = (m_v \times n) \times v_t + m_l \times v_t$$

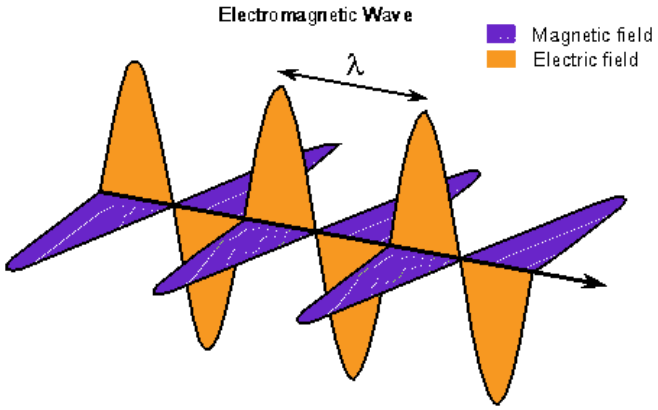
Where P is the momentum, m is mass, v is velocity, m_t is mass of train, v_t is speed of train, m_v is mass of every boxcar, n is number of wagons and m_l is mass of the locomotive. Now, if an obstacle is encountered, all momentum or kinetic energy of the train will be transferred to the obstacle at the moment of collision and it isn't necessary that all boxcars reach the location of the crash, because the train is rigidly connected, This momentum from the end to the front, is transferred to the collision point and the obstacle.

If it crashes and momentum is transfer in a short time, it is natural that the boxcars are thrown back from their route and railroad. Because the boxcars are connected together by a drive axle, they have freedom of rotation and the force of impact will scatter them.

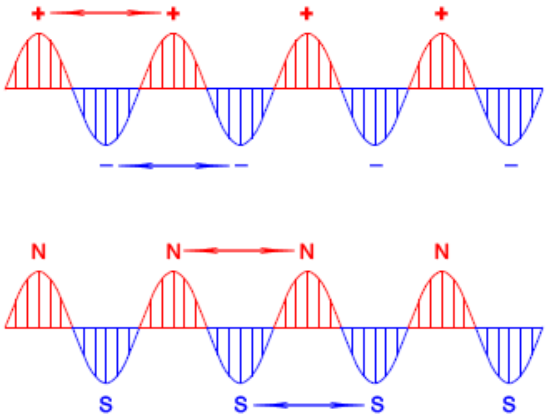
What Is Gamma Radiation?

A gamma ray is an electromagnetic wave with very high frequency. According to current definitions, an electromagnetic wave is electrical sine oscillation, and there appears a similar magnetic field perpendicular to it. See the following figures:

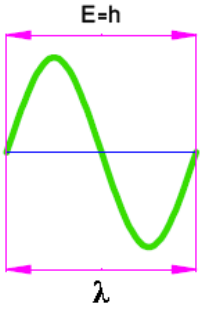




Now, we separate the two waves and survey them separately:



As we know, the same electric and magnetic poles propel themselves, so by collision with these x or γ rays, momentum and impact of the last discrete wavelength is transferred to the first wavelength as well as at the obstacle collision point, by an electromagnetic assertion force of the same pole, and it isn't necessary for all wavelengths to arrive at the point of the collision. Now, we measure the momentum of the electromagnetic wave quantum, or so called photon:



Here E is the energy of every cycle of the electromagnetic wave, with the value of hf, (Planck's constant) with λ as the wavelength. We calculate the momentum of each wave cycle, in the first stage.

$$E = mc^2 \Rightarrow \; m = \frac{E}{c^2}$$

$$E = h \Rightarrow \; m = \frac{h}{c^2}$$

$$P = mv$$

$$v = c \Rightarrow \; P = \frac{h}{c^2}c = \frac{h}{c}$$

$$c = \lambda f \Rightarrow \; P = \frac{h}{\lambda f}$$

Here, E is energy and m is mass in the mass-energy equivalence principle and c is light speed. After calculating the momentum of a wave cycle, we multiply it with the total frequency, over a one second period, and then we arrive at the total momentum of a discrete electromagnetic wave:

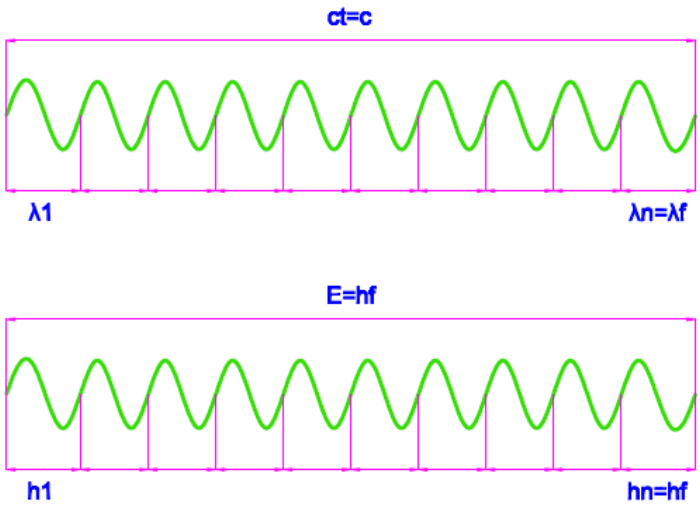
$$P = \frac{h}{c} \times f = \frac{hf}{c}$$

$$P = \frac{h}{\lambda f} \times f = \frac{h}{\lambda}$$

Where the obtained result is similar to previous results, i.e.:

$$P = \frac{h}{\lambda} = \frac{hf}{c} = \frac{E}{c}$$

And the overall conclusion is that energy is quantum-packaging in some ranges of space-time which it is related to the time and distance covered by light during one second. This indicates the important fact that our current traditional divisions in seconds , minutes, hours are related to highly-intelligent creatures which they derived from an advanced geometry and mathematics. They have transferred the knowledge of measurement of time, (calendars clocks), i.e. because they used a frequency unit in the Planck equation as a cycle in one second. This means that electromagnetic energy is packaging in a quantity of time and its unit is the second. Length is measured in meters. We can view this package as a mechanical mass i.e. photon or string with the length of $c \times t$ and t=1. Electromagnetic waves show various behaviors in absorption, production when colliding with an obstacle. For example, some of them are reflected by atmospheric layers and some of them such as microwaves (radar), are absorbed by water but they are all reflected by rigid bodies. Also, visible spectra are reflected by smooth surfaces, such as s mirror. The x-ray is reflected in the Compton phenomenon, if the radiation angle is perpendicular, but if it is less than this angle, some of its energy is absorbed by the electron and the rest of the wave is diverted. All are imagined as particles of electromagneticism and light, but a quantum of light, or photon, isn't a particle. It is a string with $c \times t$ as a length, and t as one second, and wavelength λ. Its number is dependent on the frequency, i.e. as the following figure:



But these quanta can interact with particles without mass, and they can appear massive as though containing particles. In this descriptions, all radiated photons by atoms are one-second photons. This does not mean that their emission and absorption needs one second of time, but the energy of electromagnetic quanta in space-time is a quantum packet at a fixed quantity c, as the speed of their translation, and emission is very much shorter than one second. It is almost instantaneous. Now, we raise this important question: Can we connect quanta of electromagnetic energy together?
If we success in this matter, the energy of these quanta will be calculated by the following equation:

$$E = t \times hf$$

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here t is time in seconds, and these photons are called multi-second quanta, which will have extraordinary energy and their production and emission is possible and rational, because radio waves are produced with longer lengths. For example, we evaluate the energy of a 60 seconds (or one minute) gamma quantum (stringy photon):

$$t = 60$$
$$h = 6.626 \times 10^{-34}$$
$$f = 10^{22}$$
$$E = ?$$
$$E = 60 \times 6.626 \times 10^{-34} \times 10^{22}$$
$$E = 397.56 \times 10^{-12} J$$
$$E = \frac{397.56 \times 10^{-12}}{1.602 \times 10^{-19}} = 2.48 \times 10^{9} = 2.48 GeV$$

It seems that the energy of this one-minute gamma quantum is sufficient for fission of a heavy nucleus, especially a metal nucleus. It can be a nucleus that is not enriched so that mined uranium can easily be processed to create huge energy. The generators of a few-second photons can also be used in military applications, i.e. the mass of the object itself can provide huge nuclear energy for an explosion, by reflecting these few-second quanta off the object. However this issues is related to human nature and physics. We can use all phenomena in science in both peace and war, and caution should be expressed regarding military application. Theorists can not prevent its use because it is the responsibility of the manufacturers and users to show restraint. It should be noted that if we can produce few seconds' quanta of electromagnetic waves, we will achieve an easier solution than used current fission or fusion practices,, because we can use metals such as tungsten and regulate the reaction speed of fission by the intensity of generation of laser-like waves.

Perhaps this new matter seems very strange and should be made more intelligible!
Imagine that there are intelligent creatures who live in a planet very far away from us and their time of a second is twice that of ours. As they are thoughtful and interested in science, they know the quantum energy of electromagnetic waves in photoelectric phenomenon and they know how to calculate such energy using Planck's relation. However, their Planck constant is calculated as the one half of ours because:

$$S = 2s$$

$$F\left(2\times \text{cycles}/S\right) = 2f\left(\text{cycles}/s\right)$$

$$H = \frac{1}{2}h$$

$$E = hf = HF = \frac{1}{2}h\times 2f$$

For them, as each second equals our 2 seconds, F is the frequency of electromagnetic waves calculated by them, which is twice the frequency calculated by us (in the same and definite range of spectrum). And for them, H is equal to one half Planck's constant. In this way we both can get the same result when calculating the quantum energy of a definite spectrum.
Such intelligent creatures would surely know the Mass-energy equivalence principle, Compton and De Broglie relations, etc. and they would have the following equations:

$$C = 2c \Rightarrow \ c = \frac{C}{2}$$

$$E = mc^2 = m\left(C/2\right)^2$$

$$P = \frac{hf}{c} = \frac{HF}{C/2} = \frac{2HF}{C} = \frac{2E}{C}$$

$$P = \frac{h}{\lambda} = \frac{2H}{\lambda}$$

$$V = 2v \Rightarrow \ v = \frac{V}{2}$$

$$\lambda = \frac{h}{P} = \frac{2H}{mv} = \frac{2H}{mV/2} = \frac{4H}{mV}$$

The speed v, of dynamic bodies and the constant speed of light for them, is twice ours. For the Compton phenomenon we have:

$$\lambda' - \lambda = \frac{h}{m_e c}\left(1-\cos\theta\right) = \frac{2H}{m_e C/2}\left(1-\cos\theta\right) = \frac{4H}{m_e C}\left(1-\cos\theta\right)$$

In the above equation, m_e shows the rest mass of the electron, θ shows diffraction angle, λ shows the wavelength of a radial photon and λ' shows the wavelength of a diffracted photon. Finally, these intelligent creatures will find that they have made a mistake in defining a standard unit for time and in order to remove these numeral coefficients from the above equations, they adjusted the unit for timing to our unit. In other words, one could conclude that intelligent creatures lived before us and their experiences and findings have been transferred to us.